PROJECT MANUAL

New Fire Station

FOR

City of Monette

Monette, Arkansas

Ray Lindsey, Architect

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SECTION 00010
INVITATION FOR BIDS

Separate sealed bids for a for a new fire station for City of Monette, AR UNTIL 2:00 P. M., central daylight time, Tuesday October 29, 2024. Bids will be privately opened by the city council.

The project consists of a new metal framed building, including site work, plumbing, HVAC, and electrical systems noted.

The Information for Bidders, Form of Bid, Form of Contract, Plans, Specifications, and Forms of Bid Bond, Performance and Payment Bond, and other contract documents may be examined at the following:

Jonesboro Blueprint, Plan Room
222 S. Madison Avenue
Jonesboro, AR 72401
870-932-4349

Copies of the bid documents may be obtained at Jonesboro Blueprint upon payment of $100.00 for each set. Any unsuccessful bidder, upon returning such set within ten days of bid date in good condition, will be refunded his deposit, less reproduction and/or shipping costs of $25.00.

A Performance and Payment Bond in the amount of the contract will be required of the successful bidder. No bid maybe withdrawn for a period of 30 days after the opening of bids. Modified bids or conditional bids will not be accepted.

The owner reserves the right to waive any informality or irregularity in any bid and to reject any or all bids.

ITEM 1 – GENERAL

1.01 SUMMARY

a) Identification: New Fire Station
Location/Address: Highway 18 East
City and State: Monette, AR

b) The Work of this Project shall include all construction work shown on the Drawings and specified herein including, but not necessarily limited to general, civil, landscape, mechanical, and electrical work.

c) The Project consists of the grading the site and installation of playground equipment as shown on drawings, including all finishes, site improvements, plumbing, mechanical and electrical relocation work.

1.02 RELATED DOCUMENTS AND SECTIONS

a) None

1.03 QUALITY ASSURANCE

s) All work described in these Specifications or shown on the drawings and all work necessary to complete finish of the work as described or shown is to be executed in a thoroughly substantial and workmanlike manner. All work shall be done
by persons who are thoroughly experienced in their particular trade or crafts.

ITEM 2 – PRODUCTS

NOT USED

ITEM 3 – EXECUTION

3.01 LAYING OUT WORK

a) A licensed surveyor shall be retained by the Contractor to locate all general reference points and establish building locations on the site. The Contractor shall be responsible for protecting these reference points.

b) The Contractor and each Subcontractor shall lay out

their own work and be responsible for all lines, elevations and measurements of buildings, utilities, and other work executed by them. They shall lay out all work from dimensions given on plans. They shall take measurements and verify dimensions of existing work, if any, that affect their work or to which their work is to be fitted. They alone shall be responsible for the correctness of all measurements and shall verify all grades, lines, levels, elevations, and dimensions shown prior to commencing work.

c) Contractor and Subcontractors shall consult Drawings and plan work so that excavated material, demolished materials, new building materials, etc. are not placed where they will interfere with the work of others.

3.02 CLARIFICATION OF INFORMATION

a) Should it appear that the work intended to be described, or any of the matters relative thereto, are not sufficiently detailed or explained on the Drawings, or in the Specifications, consult the Architect for such further drawings or explanations as may be necessary, and conform to the same as far as they shall be consistent with original Drawings. In the event of any questions arising with respect to the true meaning of the Drawings and Specifications, reference shall be made to the Architect whose decision shall be final and conclusive. **In no case shall any work proceed in uncertainty**.

b) It is the intention of the Specification and the Drawings to provide a job complete in every respect. The Contractor and subcontractors are to be responsible for this result and to turn over the Project in complete operating condition regardless of whether the Drawings and Specifications cover every individual item in minute detail.

c) In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

d) Certain schedules of materials, diagrams of mains and risers accompany the Drawings in order to accommodate the

Contractor and Subcontractors and to avoid a confusing amount of lettering on the Drawings. They are intended to be used in conjunction with the Drawings and Specifications, but are not to be interpreted in any manner as modifying or restricting such Drawings or the Specifications. Schedules of materials or room finishes are furnished as a convenience only, and there is no guarantee that any schedule includes all of the work or materials required by the Drawings and Specifications.

3.03 CORRELATION WITH OTHER TRADES

a) In the event of a discrepancy between this Section and portions of the Mechanical or Electrical Specifications relative to responsibilities in the correlation of the work of various trades, conditions outlined in this Section shall take precedence.

b) The Contractor and Subcontractors shall be required to furnish and install in accordance with the progress schedule, all items pertinent to their contract including conduits, outlets, sleeves, boxes and other materials and equipment to be built into work performed or to be performed by others. Location of all sleeves penetrating construction work shall be coordinated with the Contractor.

c) In the event timely delivery of sleeves or other materials cannot be made and to avoid delay, affected trade may arrange to have boxes or other forms set at locations where piping or other material is to pass through or into slabs, walls or other work. Upon subsequent installation of sleeve or other material, the trade requiring same shall arrange to fill around them with materials as required by Contract. Labor costs only, thus resulting from filling about sleeves, shall be borne by trade responsible for installation of sleeves or other materials at no extra cost to Owner.

d) All curbs or blocking required for mechanical equipment, hatches, conduit passing through a roof shall be furnished and installed by the Contractor. All base flashing, metal cap, or counter flashing required by ducts, pipes or conduits passing through a roof shall be furnished and installed by trade responsible for same.

e) The Contractor shall be responsible for making weather tight all joints about pipe sleeves, conduits and such in exterior

walls, but it shall be the responsibility of the trade who provides the sleeve to make weathertight the joint within the sleeve, between the sleeve (or box) and material or item therein contained.

f) Concrete bases or curbs required for mechanical, electrical or air conditioning equipment are included in architectural specifications. All anchor bolts, templates and such shall be furnished by the trade supplying the equipment.

g) The Plans and Details are drawn to scale but are not generally dimensioned. The contractors shall verify all dimensions shown on the Drawings by actual measurement on the job. Subcontractors shall verify the equipment to be furnished under their requirements with other trades, or refer the matter to the Contractor for decision. Dimensions on Drawings and notes indicating dimensions shall be strictly complied with. The architect reserves the right to make slight changes in the piping runs, or location of equipment without additional cost to the Owner. Changes may be necessary due to unforeseen interference of other piping and equipment.

h) Items noted "N.I.C." (Not In Contract), "By Owner", or "Existing" shall not be included in contract, but provision shall be made by respective trades to allow installation of items noted. All finishes of floors, bases, wainscots, walls and ceiling behind, under and/or over these items shall be included in the Contract unless otherwise noted.

3.04 MEASUREMENTS AND ACCEPTANCE OF PRECEDING WORK

a) Before ordering any material or doing any work, the Contractor and Subcontractors shall verify all measurements of the building for their particular class of work and shall be responsible for the correctness of same.

b) No extra charges or compensation will be allowed on account of the difference between actual dimensions and measurements indicated on the Drawings. Before starting any operation, the Contractor and Subcontractors shall examine work performed by others to which his work adjoins or is applied

and will report to the Architect conditions that will prevent satisfactory accomplishment of the Contract.

c) All defects in surfaces or construction prepared by one trade to receive work by other trades shall be reported in writing to Architect, who shall instigate remedial action on such defects. Commencement of work by a trade on a surface or construction shall imply acceptance of such surface or Construction. Any required correction of work due to such defects shall be at the cost of the installing trade or contractor.

d) Failure to notify the Architect of deficiencies or faults in preceding work will constitute acceptance thereof and waiver of any claim of its unsuitability.

3.05 CUTTING AND PATCHING OF WORK

a) The Contractor and Subcontractors shall do all cutting, fitting or patching of their work that may be required to make its several parts come together properly and fit it to receive or be received by work of others shown upon, or reasonably implied by Drawings and Specifications for the completed structure, and shall make good after them as architect may direct. Costs caused by defective or ill-timed work shall be borne by those responsible therefor. Do not endanger any work by cutting, excavating, or otherwise altering the work and do not cut or alter the work of others without the consent of Architect. Leave all necessary holes in walls, chases, etc. required for any of the mechanical work or electrical work, provided these are accurately located before the execution of the work by the appropriate Subcontractor. Cutting required by Subcontractors and not shown on the general plans shall be one by them. Patching and repairing of the finished work made necessary by cutting in this Contract shall be done by the Contractor and paid for by the Subcontractor requiring such work. Damage to the structural members of the building by the Subcontractor shall be made good at the Subcontractor's expense. The Contractor shall obtain written approval from the Architect before cutting, drilling or driving anchors into columns or post tensioned slabs.

3.06 PROTECTION OF WORK AND PROPERTY

a) The Contractors and Subcontractors shall at all times

protect all work from damage by rain water, spring water, ground water, backing up of drains, or sewers, and all other water that may or could be admitted to the work. Provide all pumps, other equipment and closers to provide this protection, and do all pumping necessary to keep the Work free of water.

b) The Contractor and Subcontractors shall be responsible for closing openings in walls or roof made by them, which would admit water to the building.

c) The Contractor and Subcontractors shall provide protection of the work against weather, rain, wind, storms, frost, cold, or heat so as to maintain all work, materials, apparatus and fixtures free from injury and damage.

d) After roofing is installed, all work on the roof shall be done over planking or other substantial protection to spread construction loads and to isolate traffic from the roof surface. The Contractor and Subcontractors shall provide their own protection when working on the roof.

END OF THIS SECTION

BID FOR LUMP SUM CONTRACT

DATE: _____

Proposal of .....
herein after called "Bidder" a corporation, organized and existing under the laws of the State of , a partnership, or an individual doing business as_____
.....

TO: City of Monette
Monette, AR

GENTLEMEN:

The Bidder, in compliance with your invitation for bids for a new building for the church and related work; having examined the Contract Documents, the site, and being familiar with conditions surrounding the construction of the project, including the availability of materials and labor, proposes to construct the project in accordance with the Contract Documents, within the time set forth, at the price stated below.

Bidder agrees to commence work under this Contract, if selected, within 10 days of notice to proceed and fully complete the project within 180 calander days.
Bidder acknowledges receipt of the following addenda: __

.....

BASE BID: Bidder agrees to perform all work for the general construction of the building and site work as shown on the drawings and described in the specifications for the sum of:

$_____ _____dollars

CONDITIONS: The owner reserves the right to accept or reject any or all bids and to waive any formalities.Bidder agrees that his bid shall not be withdrawn for a period of 30 calendar days after the scheduled closing date.Upon notice of the acceptance of this bid, Bidder shall execute the Contract and deliver a Surety Bond within 10 days.

Respectfully submitted,

By: _____
(Title)

_____
(Business Address)

SECTION 01220
PROGRESS MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

a) Schedule and administer monthly construction progress meetings throughout progress of Work.

b) Make physical arrangements, prepare agenda, and distribute notice of each meeting to participants, and to Architect/Engineer, 4 days in advance of meeting date.

c) Preside at meetings, record minutes, and distribute copies within 3 days after meeting to participants, to entities affected by decisions at meetings, with 2 copies to Architect/Engineer.

d) Location of Meetings: Contractor's field office.

e) Attendance: Contractor, job superintendent, Subcontractors, and suppliers as appropriate to agenda; Owner, Architect/Engineer, professional consultants may attend as appropriate.

f) Minimum Agenda:
   1. Approval of minutes of previous meetings.
   2. Review of Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems which impede planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Review of off-site fabrication and delivery schedules.
   7. Maintenance of progress schedule.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding work period.
   10. Coordination of projected progress.
   11. Maintenance of quality and work standards.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01340
SHOP DRAWING, PRODUCT
DATA, AND SAMPLES

PART 1 - GENERAL

1.01 SUMMARY

A. Wherever possible throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined either by manufacturer's name and catalog number or by reference to recognized industry standards.

B. To ensure that the specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data and for its review by the Architect.

1.02 RELATED DOCUMENTS AND SECTIONS

A. Contractual Requirements for Submittals: General Conditions and Supplementary Conditions.

B. Section 01700 - Contract Closeout.

C. Individual Submittals Required: Pertinent Sections of these Specifications.

1.03 SUBMITTALS

A. Make all submittals of shop drawings, samples, requests for substitution, and other similar items, in strict accordance with the provisions of this Section of these Specifications.

1.04 DISCLAIMER

A. Contractor agrees that shop drawings submittals processed by the Architect are not change orders; that the purpose of shop drawing submittals by the Contractor is to demonstrate to the Architect that the Contractor understands the design concept; that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use.

B. Contractor further agrees that if deviations, discrepancies or conflicts between shop drawings and Contract Documents are discovered either prior to or after shop drawing submittals are processed by the Architect, the Contract Documents shall control and be followed.

PART 2 - PRODUCTS

2.01 SHOP DRAWINGS

A. Preparation:

1. Prepared by qualified detailer.
2. Identify details by reference to sheet and detail numbers shown on Contract Drawings.

B. Scale Required: Unless otherwise specifically directed by the Architect, make all shop drawings accurately to a scale sufficiently large to show all pertinent features of the items, their method of connection to the Work and the adjacent surfaces or materials.

C. Type of Prints Required:
1. Submit all shop drawings to the Architect in the form of one blueline or blackline print of each sheet.

2.02 MANUFACTURERS' LITERATURE

A. Preparation:
1. Manufacturer's standard schematic drawings:
a. Delete information which is not applicable to project.
b. Supplement standard information to provide additional information applicable to Project.
2. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
a. Clearly mark each copy to identify pertinent materials, products or models.
b. Show dimension and clearances required.
c. Show performance characteristics and capacities.
d. Show wiring diagrams and controls where applicable.

B. Number of Copies Required:
1. Submit the number of copies which are required to be returned plus 2 copies which will be retained by the Architect.
2. Where copies are required for inclusion in closeout documents, submit these in addition to the requirements specified above.

2.03 SAMPLES

A. Preparation:
1. Office samples sized to clearly illustrate:
a. Functional characteristics of product or materials, with integrally related parts and attachment devices.
b. Full range of color samples, except when specific color(s) are specified.
2. Field samples and mock-ups, when shown on the Drawings or specified in a particular Section:
a. Erect at Project site at location acceptable to Architect.
b. Construct each sample or mock-up complete, including work of all trades required in finished work.
c. Remove as directed, unless specific Section allows

incorporation in the Work after acceptance.

B. Accuracy of Sample: Unless otherwise specifically directed by the Architect, all samples shall be of the precise article proposed to be furnished.

C. Number of Samples Required:
1. Submit all samples in the quantity which is required to be returned plus one which will be retained by the Architect.
2. After review, approved samples may be used in construction of Project.

2.04 COLORS

A. General: Unless the precise color and pattern is specifically described in the Contract Documents, whenever a choice of color or pattern is available in a specified product, submit accurate color charts and pattern charts to the Architect for his review and selection.

B. Comparative Analysis: Unless all available colors and patterns have identical costs, identical performance characteristics, and are identically suited to the installation, completely describe the relative costs and capabilities of each.

2.05 SUBSTITUTIONS

A. Architect's Approval Required:
1. The Contract is based on the materials, equipment, and methods described in the Contract Documents.
2. The Architect will consider proposals for substitutions of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required by the Architect to evaluate the proposed substitution.
3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this Work by the Architect.

B. Approvals:
1. Where the phrase "Approved Substitution", "Equal Approved" or similar verbage occurs in the Contract Documents, do not assume that material, equipment or methods will be approved as equal by the Architect unless the item has been specifically approved for this Work by the Architect.
2. The decision of the Architect shall be final.

C. Availability of Specified Items:
1. Verify prior to bidding that all specified items will be available in time for installation during orderly and timely progress of the Work.
2. In the event specified item or items will not be so

available, so notify the Architect prior to receipt of bids.

3. Costs of delays because of non-availability of specified items, when such delays could have been avoided by the Contractor, shall be the responsibility of that Contractor.

2.06 MISCELLANEOUS

A. Inspections and Test Reports: Classify each as either "shop drawing" or "product data", depending upon whether report is uniquely prepared for this Project or a standard publication of workmanship control testing at point of production; process accordingly.

B. Warranties: In addition to copies desired for Contractor's use, furnish 2 executed copies for the Architect's use plus additional copies where required for maintenance manuals.

PART 3 - EXECUTION

3.01 COORDINATION OF SUBMITTALS

A. General: Prior to submittal for Architect's review, use all means necessary to fully coordinate all material, including the following procedures:
   1. Determine and verify all field dimensions and conditions, catalog numbers, and similar data.
   2. Coordinate as required with all trades and with all public agencies involved.
   3 Secure all necessary approvals from public agencies and others; signify by stamp or other means that all required approvals have been obtained.
   4. Clearly indicate all deviations from the Contract Documents.

B. Grouping of Submittals:
   1. Unless otherwise specifically permitted by the Architect, make all submittals in groups containing all associated items.
   2. The Architect may reject partial submittals as not complying with the provisions of the Contract Documents.

3.02 TIMING OF SUBMITTALS

A. General:
   1. Make all submittals far enough in advance of scheduled installation to allow sufficient time for reviews, securing necessary approvals, possible revision and resubmittal, placing orders, and securing delivery.
   2. In scheduling, allow at least 8 full working days for the Architect's review following his receipt of the submittal.

B. Delays: Costs of delays occasioned by tardiness of submittals by the Contractor shall be the responsibility of that Contractor.

3.03 IDENTIFICATION OF SUBMITTALS

A. General:
1. Consecutively number all submittals.
2. Accompany each submittal with a letter of transmittal, in duplicate, showing the date of transmittal, Specifications Section or Drawing Number to which the submittal pertains, brief description of the material submitted, notification of deviations from Contract and the company name of the originator of the submittal.

B. Resubmittals: When material is resubmitted for any reason, transmit under a new letter of transmittal; indicate by reference to previous submittal that this is a resubmittal.

3.04 PROCESSING OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Each Subcontractor shall prepare, review and approve each submittal and then transmit it to the Contractor.

B. Upon receipt of a submittal from a Subcontractor, the Contractor shall review submittal and proceed as follows:
1. If submittal is complete and in accordance with the Contract Documents, he will stamp, sign and transmit it to the Architect.
2. In the case of Structural, Mechanical or Electrical shop drawings or product data, the Contractor, following his review, stamping and signing, shall transmit the submittal directly to the Consultant and send a copy of the letter of transmittal to the Architect.

3. If the submittal is incomplete or not in accordance with the Contract Documents, the Contractor shall stamp the information "REJECTED" and return it to the Subcontractor for resubmission. The Contractor shall send a copy of the letter of transmittal to the Architect.

C. Upon receipt of a submittal from the Contractor, the Architect shall review, stamp, mark, initial, and date each submittal as follows:
1. "NO EXCEPTIONS TAKEN": This indicates that the submittal meets Contract Document requirements, the design intent, and the Architect has no objections to any of the information included with the submittal. The submittal can be distributed by the Contractor.
2. "MAKE CORRECTIONS NOTED": This indicates that the submittal is essentially acceptable in terms of Project

requirements and design intent, but some minor aspect is incorrect, the Architect has indicated a color or finish selection, or other comments have been added to the submittal Resubmittal is not necessary; the submittal can be distributed and utilized as is.

3. "AMEND AND RESUBMIT": This indicates that major corrections are required to the submittal; it may also indicate that a few changes of major significance need to be made. In this case, the submittal shall be returned to the Subcontractor through the Contractor. The Subcontractor shall correct and resubmit as specified herein.
4. "REJECTED - SEE REMARKS": This indicates that the submittal is unacceptable. Reasons may include unacceptable manufacturer, incorrect model or product, or incomplete submittal as defined herein. The Architect shall note the reason for rejection and the submittal shall be returned to the Subcontractor through the Contractor. The Subcontractor shall correct and resubmit as specified herein.

D. Upon receipt of a submittal from the Contractor, the Consultant shall review and forward each submittal as follows:
1. If the submittal is acceptable, the Consultant shall stamp, sign, date, and forward it to the Architect for his review as described in Paragraph 3.04.C.
2. If major corrections are required or the submittal is unacceptable, the Consultant shall indicate the objections, return the submittal to the Subcontractor through the Contractor, and send a copy of the submittal to the Architect so that he is aware of the reasons for the Consultant's actions. The Subcontractor shall correct and resubmit as specified herein.

E. When a submittal is returned by the Architect and resubmittal is not required the Contractor shall:
1. Review submittal for Architects/Consultant's comments and take appropriate action indicated.
2. Complete field verifications not possible during earlier review described in Paragraph 3.01.A.
3. Initial and date submittal again to verify his acceptance and/or resolution of Architect's/Consultant's comments.
4. Distribute submittal as specified in Article 3.05.

3.05 DISTRIBUTION

A. Shop Drawings shall be reproduced by the Contractor from the final, processed submittal bearing the Architect's review stamp.

B. The Contractor shall distribute reproductions of shop drawings to the following:

1. Subcontractor who prepared submittal (verify number of copies required)
2. Job site file
3. Other affected Subcontractors
4. Suppliers or fabricators

C. The Contractor shall retain the processed shop drawings for the record.

D. Distribute samples and copies of product data which carry the Architect's review stamp as directed by the Architect.

3.06 COMMENCEMENT OF WORK

A. The manufacture or construction of any pieces of equipment, device, or other item for which shop drawings, product data, or samples are required to be furnished, shall not commence prior to complete processing of the appropriate submittal.

B. The Contractor or any Subcontractor who proceeds without a submittal bearing the Architect's stamp does so at his own risk. Architect shall maintain the right to reject work or materials provided without proper prior submittal.

END OF SECTION

SECTION 01410
TESTING LABORATORY
SERVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Contractor shall employ and pay for the service of an Independent Testing Laboratory acceptable to the Architect to perform specified services and testing.
   1. Employment of the laboratory shall in no way relieve Contractor obligations to perform the Work of the Contract.

B. Related Requirements in Other Documents of the Project Manual:
   1. Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities: Conditions of the Contract.

C. Related Requirements Specified in Other Sections:
   1. Other Division 1 Sections - General Requirements.
   2. Section 02200 - Earthwork.
   3. Section 02513 - Asphaltic Concrete Paving.
   4. Section 02526 - Concrete Curb and Gutters.
   5. Section 03300 - Cast-In-Place Concrete.
   6. Section 04100 - Mortar.
   7. Section 04200 - Unit Masonry.
   8. Section 05120 - Structural Steel.

1.02 QUALIFICATIONS OF LABORATORY

A. Meet "Recommended Requirements for Independent Laboratory Qualification", published by American Council of Independent Laboratories.

B. Meet basic requirements of ASTM E329, "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials Used in Construction".

C. Authorized to operate in the State in which the project is located.

D. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during tie most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.

E. Testing Equipment: Calibrated at reasonable intervals by devices of accuracy traceable to either:
   1. National Bureau of Standards.
   2. Accepted values of natural physical constants.

PART 2 - PRODUCTS

Not Used

3.01 LABORATORY DUTIES

A. Cooperate with Architect and Contractor. Provide qualified personnel after due notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction.
   1. Comply with specified standards.
   2. Ascertain compliance of materials with requirements of Contract Documents.

C. Promptly notify Architect and Contractor of observed irregularities of deficiencies of work or products.

D. Promptly submit 5 copies of written report of each test and inspection to Architect. Each report shall include:
   1. Date issued.
   2. Project title and number.
   3. Testing laboratory name, address and telephone number.
   4. Name and signature of laboratory inspector.
   5. Date and time of sampling or inspection.
   6. Record of temperature and weather conditions.
   7. Date of test.
   8. Identification of product and specification section.
   9. Location of sample or test in the Project.
   10. Type of inspection or test.
   11. Results of test and compliance with Contract Documents.
   12. Interpretation of test results, when requested by Architect.

E. Perform additional tests as required by Architect, or Owner.

3.02 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

A. Laboratory is not authorized to:
   1. Release, revoke, alter or expand on requirements of Contract Documents.
   2. Approve or accept any portion of the Work.
   3. Perform any duties of the Contractor.

3.03 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with laboratory personnel, provide access to Work, and to manufacturer's operations.

B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.

C. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other materials mixes which

require control by the testing laboratory.

D. Furnish copies of product test reports as required.

E. Furnish incidental labor and facilities:
   1. To provide access to work to be tested.
   2. To obtain and handle samples at the Project site or at the source of the product to be tested.
   3. To facilitate inspections and tests.
   4. For storage and curing of test samples.

F. Notify laboratory sufficiently in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
   1. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred due to Contractor's negligence.

G. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's convenience.

H. Pay for additional inspections, sampling and testing required when initial tests indicate work does not comply with Contract Documents.

END OF SECTION

SECTION 01500
CONSTRUCTION
FACILITIES AND
TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary facilties and utilities required for the execution of the Work.

B. Unless otherwise specified herein, temporary facilities shall be provided, maintained and paid for by the Contractor and on completion of the Project the Contractor shall remove these temporary facilities from the premises.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.02 TEMPORARY OFFICE

A. The Contractor shall provide a weatherproof office on the site with adequate heat and electric service for the safekeeping of drawings, records and supplies. This office shall be for the use of the Contractor and all Subcontractors.

B. Telephone: In the temporary office, the Contractor shall provide and maintain a telephone with a large bell on the outside which can be heard throughout the work. This telephone shall be provided until the Work is completed. It shall be for the use of individuals performing all or any portion of the Work and the Architect/Owner. All long distance calls shall be paid for by the caller.

2.03 TEMPORARY ACCESS

A. The Contractor shall be responsible for locating, providing and maintaining all temporary access to the construction site where such access will not interfere with the progress of the Work. The temporary access shall be for the free use of all, including Subcontractors, vendors, the Owner and the Architect. The temporary access shall be adequate to sustain the loads to be carried and shall be maintained in a useable condition at all times.

2.04 TEMPORARY UTILITIES

A. Utility Permits: The Contractor shall pay for and make all necessary arrangements for the securing of temporary permits

for the installation of electric light, power and water during the term of building operation under the Contract.

B. Electric Service: The Contractor shall provide, maintain, pay for and arrange with the local utility company for electrical service of adequate capacity for the needs of the Contractor and all Subcontractors on the site during the construction period. The Contractor shall maintain light bulbs and extension cords sufficient to light the building for safety purposes and to carry on the Work properly.

C. Heating and Ventilating: During the construction of the building and until Substantial Completion of the Work, the Contractor shall provide, pay for and maintain all heat, fuel and services necessary to protect all work and materials against injury from dampness and cold. Temporary heating units shall be approved types that will not stain or damage building materials. When the Architect can certify that the building is satisfactorily enclosed and the permanent heating plant is completed and ready for use, the permanent heat generating and permanent distribution system will be permitted for use only upon meeting the following requirements:
   1. All equipment shall be installed complete with all necessary systems and accessories; and shall be started up, maintained, serviced, and operated in strict accordance with manufacturer's instructions so as to prevent any kind of damage to equipment, or any impairment of its anticipated usefulness and performance.
   2. Guarantee periods required by the Contract Documents shall not be compromised.
   3. Provide adequate ventilation as required to keep temperature of building from exceeding by more than 10 degrees F., ambient outdoor temperature when such ambient temperature exceeds 70 degrees F. and to prevent accumulation of excess moisture in building.
   4. At completion of Work, completely clean each permanent unit used, install new filters, and perform all service functions required for placing units in use and qualifying for required guarantees.

D. Sanitary Facilities
   1. The Contractor shall provide and maintain adequate chemical toilet facilities in a clean and sanitary condition for the use of all.
   2. The Contractor shall provide drinking water from a proved safe source, so piped or transported as to be kept clean and fresh and served from single service containers or satisfactory types of sanitary drinking stands or fountains.

2.05 TEMPORARY CONSTRUCTION

A. The Contractor shall maintain equipment such as temporary stairs, barricades, ladders, ramps, scaffolds, runways, derricks, chutes and the like, as required for proper execution of the Work. Such apparatus, equipment and construction shall be as required by all State and local laws applicable thereto.

2.06 TEMPORARY STORAGE

A. The Contractor and each Subcontractor shall provide storage sheds as their needs may require. Subcontractors shall coordinate the location of their sheds with the Contractor. All temporary structures shall be removed before final acceptance of the Work.

2.07 SIGNS

A. No signs, billboards or other advertisements shall be erected on the premises without the permission and approval of the Architect.

B. The Contractor shall furnish and maintain all necessary signs required for the performance of the Work such as "Office", "Men", "Women", "Danger", "High Voltage", etc.

C. Project sign shall be erected by the Contractor with the name of the Project, Owner, Contractor, and Architect. Minimun size shall be 4’ x 8’ in location as directed by the Owner.

2.08 WATER

A. Water is available for construction purposes at the building site. Those needing water shall furnish their own hoses.

2.09 FIRST AID FACILITIES

A. The Contractor shall provide and maintain adequate first aid facilities and clearly visible signage identifying location of said facilities.

2.10 TEMPORARY CONTROLS

A. The Contractor shall be responsible for the maintenance of the following protection/control:
   1. Site access.
   2. Fire protection.
   3. Dust control.
   4. Protection of adjacent property.
   5. Fences and barricades.
   6. Traffic/parking control.
   7. Security.

8. Site safety.

PART 3 - EXECUTION

Not Used

END OF SECTION

SECTION 01630
PRODUCT OPTIONS AND
SUBSTITUTIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Administrative and procedural requirements for handling requests for substitutions made during bidding and after award of the Contract.

1.02 PRODUCTION OPTIONS

A. Reference Specifications: For products specified only by reference standard, Contractor shall select a product meeting the requirements of the specified standard. Contractor bears sole responsibility that product provided meets the requirements of the specified reference standard.

B. Performance and Descriptive Specifications: For products specified by only indicating performance properties and description of a product, Contractor shall provide a product which meet criteria specified and related requirements indicated on the Drawings. Approval of the Architect, for use of product, is not required. Contractor bears sole responsibility that product provided meets the requirements of the Contract Documents.

C. Proprietary Specification Naming Several Manufacturers: For products specified by naming more than one product or manufacturer, Contractor may select one of the products or manufacturers named.

D. Proprietary Specifications Noting Approved Substitution": For products specified by naming one or more products or manufacturers and stating Approved Substitution", Equal Approved", Or Equal", or similar verbage, the products named shall establish a standard and the Contractor has the option to provide one of the products named or submit a request for approval to the Architect for any product or manufacturer which is not specifically named prior to opening of Bids in accordance with the Instructions to Bidders. Substitute products not approved by the Architect before Bids are opened shall not be furnished or installed.

E. Proprietary Specifications Without Substitution: For products specified by naming one product or manufacturer and not stating Approved Substitution", Equal Approved", Or Equal", or similar verbage, there is no option and substitutions will not be considered.

F. Installation of Products Not Approved: Substitute products which require Architect's prior approval shall not be ordered, used or installed without written acceptance of Architect. Except where Contractor is permitted to make product selections or substitutions without Architect's prior approval, products which are installed and which are not specified in the Contract Specifications or otherwise approved by Architect, in writing, shall be subject to removal and replacement with an approved product. Contractor shall bear costs involved in the removal and replacement of a product which has not been specified or approved by the Architect.

1.03 SUBSTITUTIONS

A. Conditions for Substitutions: No substitutions of products from that specified within the Contract Specifications or approved by Addenda issued to Contract Documents will be entertained by the Architect, except in the case of product unavailability or other conditions beyond the control of the Contractor. Substitutions will be entertained by the Architect, prior to Bids being received, in accordance with approval procedures specified in the Instructions to Bidders.

B. Substitution Request Procedure: Where conditions exist beyond the Contractor's control, Contractor shall be permitted to submit for product substitution. Submit a separate request for each substitution. Support each request with the following information as applicable:
   1. Complete data substantiating proposed substitution is in accordance with requirements stated in the Contract Documents:
      a. Product identification, including manufacturer's name and address.
      b. Manufacturer's literature identifying:
         1) Product description.
         2) Reference standards.
         3) Performance and test data.
      c. Samples, as applicable:
      d. Name and address of similar projects on which product has been used and date of each installation.
   2. Itemize comparison of proposed substitution with product specified. List significant variations.
   3. Data relating to changes in construction schedule.
   4. Any affect of substitution on separate contracts.
   5. List of changes required in other work or products.
   6. Accurate cost data comparing proposed substitution with product specified. State amount of any net change to Contract Sum.
   7. Designation of required license fees or royalties.
   8. Designation of availability of maintenance services and

sources of replacement materials.

C. Substitutions Disapproval: Substitutions will not be considered for acceptance when:
   1. They are indicated or implied on Shop Drawings or Product Data submittals without a formal request from the Contractor.
   2. They are requested directly by a subcontractor or supplier.
   3. Acceptance will require substantial revision of Contract Documents.
   4. Conditions for substitutions specified do not exist.

D. Approval of Substitute Products: Architect will determine acceptability of proposed substitutions.

1.04 CONTRACTOR'S REPRESENTATION

A. Contractor's Responsibility When Making Substitution: Whenever a product selection or substitution is made by the Contractor, Contractor represents that he has done the following:
   1. He has investigated the proposed product and has determined that it is equal to or superior in all respects to that specified.
   2. He will provide same warranties or bonds for substitution as for product specified.
   3. He will coordinate installation of accepted substitution into the Work, and will make changes as may be required for the Work to be complete in all respects.
   4. He waives claims for additional costs caused by substitution which may subsequently become apparent.

1.05 ARCHITECT'S DUTIES

A. Review Requests: Review Contractor's requests for substitutions with reasonable promptness.

B. Notification of Decision: Notify Contractor, in writing, of decision to accept or reject requested substitution.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01700
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements and administrative procedures for closing out of the Work.
   1. Cleaning.
   2. Final inspection.
   3. Manuals
   4. Project Record Documents.
   5. Closeout submittals.

1.02 RELATED DOCUMENTS

A. General Conditions and Conditions of the Contract.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 CLEANING

A. Contractor shall at the time of Substantial Completion of the Project conduct final inspection of sight-exposed interior and exterior surfaces, and of accessible concealed spaces.
   1. Remove paint, putty and labels from all glass and wash and polish all glass surfaces.
   2. Replace, at Contractor's own expense, all damaged, broken and scratched glass.
   3. Remove all marks, stains, soil or dirt from all painted, tiled or decorated work.
   4. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.
   5. Clean all fixtures and equipment and restore to original finish.
   6. Clean and polish all hardware.
   7. When space in the building is used as a shop, storage area, etc., the Contractor will be held responsible for repairs, patching, and cleaning arising from such use.
   8. Thoroughly clean all plumbing fixtures, removing all plaster, paint, stickers, rust stains, and other foreign matter or discoloration, leaving every part in an acceptable condition and ready for use.
   9. Thoroughly clean all heating and related equipment, leaving every part in a first class condition.
   10. Clean all surfaces of all coils, fan housing, fan wheels, and clean or replace air filters, leaving the installation in first class condition.
   11. Wash and otherwise clean lighting fixtures.

B. Cleaning Standards: The standard of acceptability of cleaning operations shall be equivalent to a professional janitorial cleaning service.
   1. Employ experienced workmen, or professional cleaners, for final cleaning.

C. Refer to the individual specifications sections for additional cleaning requirements for the work specified.

3.02 FINAL INSPECTION

A. Submit written certification to the Architect that Work is completed and ready for final inspection.

B. Architect will make inspection with reasonable promptness. If Work is incomplete or defective, Architect will notify Contractor to remedy deficiencies.

C. Upon re-notification of completion, Architect will re-inspect Work and, when acceptable, issue Certificate of Substantial Completion.

3.03 MANUALS

A. Manuals: Where manuals are required to be submitted covering items included in this Work, prepare all such manuals in durable plastic binders approximately 8 1/2" by 11" in size and with at least the following:
   1. Identification on, or readable through, the front cover stating the general nature of the manual;
   2. Neatly typewritten index near the front of the manual furnishing immediate information as to location in the manual of all emergency data regarding the installation;
   3. Complete instructions regarding operation and maintenance of
      all equipment involved;
   4. Complete nomenclature of all replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts;
   5. Copy of all guarantees and warranties issued;
   6. Copy of the final Shop Drawings with all data concerning all changes made during construction.

B. Extraneous Data:
   1. Where contents of manuals include manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete or otherwise clearly indicate all manufacturers' data with which this installation is not concerned.

C. Number of Copies Required:
   1. Unless otherwise specifically directed by the Architect or

stipulated in the pertinent Section of these Specifications, deliver one copy of the Manual to the Owner and one copy to the Architect.

3.04 PROJECT RECORD DOCUMENTS

A. Delegate the responsibility for maintenance of Project Record Documents to one person on the Contractor's staff as approved by the Architect.

B. Following receipt of the Owner's Notice to Proceed, secure from the Architect at no charge to the Contractor one complete set of all Documents comprising the Contract to be used soley for the Project Record Documents.

C. Immediately upon receipt of the job set, identify each of the Documents with the title, "PROJECT RECORD DOCUMENTS."

D. Accuracy of Records:
1. Thoroughly coordinate changes within the Project Record Documents, making adequate and proper entries on each page of the Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonable on information obtained from the approved Project Record Documents.

E. Preservation:
1. Considering the Contract completion time, the probable number of occasions upon which the Project Record Documents must be taken out for new entries and for examination, and the condition under which these activities will be performed, devise a suitable method for protecting the Project Record Documents.
2. Do not use the Project Record Documents for any purpose except entry of new data and for review by the Architect.
3. Maintain the Project Record Documents at the site of Work.
4. In the event of loss of recorded data, use means necessary to again secure the data to the Architect's approval.

F. Making Entries On Drawings:
1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
2. Date all entries.

3. Call attention to the entry by a "cloud" drawn around the area affected.
4. In the event of overlapping changes, use different colors for the overlapping changes. Architect.

3.05 CLOSEOUT SUBMITTALS

A. When the Architect has determined that the Work is acceptable under the Contract Documents and the Contract fully performed, the Contractor shall prepare and submit his final Application for Payment to the Architect together with the following:
   1. Contractor's Affidavit of Payment of Debts and Claims, AIA Document G706.
   2. Contractor's Affidavit of Release of Liens, AIA Document G706A.
   3. Contractor's lien waiver in the full amount of the Contract Sum.
   4. Lien waivers from all Subcontractors, sub-subcontractors and major material suppliers who have furnished material for the work under contract with the Contractor or a Subcontractor. The lien waivers shall be in the full amount of the contract involved.
   4. Consent of surety to final payment on Consent of Surety Company to Final Payment, AIA Document G707.
   6. Evidence of compliance with requirements of governing authorities:
      a. Certificates of Inspection from all required agencies and departments.
      b. Certificate of Occupancy.
   7. Project Record Documents.
   8. Operating and Maintenance Data, Instructions to Owner's Personnel
   9. Warranties and Bonds.

END OF SECTION

SECTION 02200
EARTHWORK

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Site clearing for excavation work.

B. Foundation excavation, backfill and compaction.

C. Rough grading, finish grading and fills.

1.02 RELATED DOCUMENTS AND SECTIONS

A. Document 00220 - Soil Data.

B. Section 02513 - Asphaltic Concrete Paving.

C. Section 02526 - Concrete Curbs and Gutters.

D. Section 03300 - Cast-In-Place Concrete.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Test Reports:
      a. Field density test.

1.04 QUALITY ASSURANCE

A. Comply with all codes, laws, ordinances and regulations of governmental authorities having jurisdiction over this part of the work.

B. Provide protection for all persons and property in accordance with current ANSI/NFPA 241, Safeguarding Building Construction and Demolition Operations.

1.05 TESTING SERVICES

A. The testing laboratory will be responsible for conducting and interpreting tests, state in each report whether or not the test specimens conform to all requirements of the Contract Documents and specifically note any deviation therefrom.

B. General requirements for testing are specified in Section 01410. Specific test and inspection requirements are specified herein.

1.06 EXAMINATION OF SITE AND RECORDS

A. Examine the site, the Drawings and records of existing subsurface soil conditions, including subsurface explorations available through the Architect, to determine the conditions under which the work will be performed. Subsurface soil

investigation data, including records of test borings are made available for information only and are not guaranteed to represent all subsurface conditions that will be encountered. The existing construction shown, and soil investigation data represent all conditions known to the Owner. The Contractor shall formulate his own conclusions as to the subsurface conditions and shall remove all materials to the design sub-grades indicated or hereinafter specified.

1.07 PROTECTION OF UTILITIES

A. Protect existing service lines and related structures encountered in the excavation work. Where such lines and structures have been undermined due to the excavation work, provide suitable supports. If damaged, repair such lines and structures or arrange for their repair with the proper authorities or companies.

B. Report uncharted and incorrectly charted lines to Architect for further direction.

1.08 DUST CONTROL

A. Use means necessary to control dust on and near the work and on and near off-site borrow areas if such dust is caused by the Contractor’s operations during performance of the work or if resulting from the condition in which the Contractor leaves the site.

B. Thoroughly moisten all surfaces as required to prevent dust being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

1.09 PROTECTION OF TREES

A. Protect trees which are indicated on the Drawings to remain or to be relocated. Box trunks of such trees with 2" thick wood planks secured to trunks with wire or metal straps. Do not store material or pile debris under such trees. Do not perform excavating or extensive grading under such trees within the spread of the branches. If excavation under such trees is necessary, and is approved, do not cut roots which are over 1" in diameter. Where branches of such trees are removed to facilitate construction, or the trees are inadvertently damaged, repair damage to such trees with persons skilled in the care of trees.

1.10 EARTH RETAINAGE

A. Take every precaution to guard against movement or settlement of existing and new construction, utilities, paving, walks, light standard, piping, conduit etc., and provide, at own expense, earth retainage necessary in connection therewith. The Contractor shall be entirely responsible for the design, and adequacy of earth retainage required.

B. Submit design of above protection to the Structural Engineer for review prior to commencement of excavation.

PART 2 - PRODUCTS

2.01 MATERIALS

A. In general, fills shall be clean friable earth, sand, or clays of low plasticity, free of organic material, ice, cinders, trash, rubble and stones greater than 6" in diameter, unless otherwise specified.

B. Granular fills shall consist of well graded sand or gravel meeting approval of Soils Consultant as specified in the Soils Report.
   1. Fills below exterior concrete paving (e.g. sidewalks) within 5 feet of the building shall consist of non-frost susceptible granular soils to a depth of not less than 4 feet.

C. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil clay I umps stone and other objects over 2" in diameter, and without weeds, roots and other extraneous or toxic matter harmful to plant growth.

PART 3 - EXECUTION

3.01 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions interfering with installation of new construction. Remove such items elsewhere on site or premises as specifically indicated.

B. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to remain.
   1. Completely remove stumps, roots, and other debris.
   2. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction.
   3. Use only hand methods for grubbing inside drip line Of trees indicated to be left standing.
   4. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further

excavation or earthwork is indicated.

a. Place fill material in horizontal layers not exceeding 6" loose depth, and thoroughly compact to a density equal to adjacent original ground.

C. Topsoil: Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.

1. Remove heavy growths of grass from areas before stripping.
2. Where trees are indicated to be left standing, stop topsoil stripping a sufficient distance to prevent damage to main root system.
3. Stockpile topsoil in storage piles in areas shown, or where directed. Construct storage piles to freely drain surface water.
4. Dispose of unsuitable or excess topsoil same as excess excavated material.

D. Remove all existing on-grade or below grade construction which may be encountered in areas to be occupied by new construction. In areas of general grading and areas which are to be paved remove all obstructions that may be encountered to a depth of at least 18" below the rough grades.

1. Abandonment or removal of certain underground pipe or conduits may be shown on mechanical or electrical drawings (if any), and is included under work of those sections. Removal of abandoned underground piping or conduit interfering with construction is included under this Section.

3.02 EXCAVATION

A. Material excavated at the site may be considered usable for grading and backfill purposes subject to the requirements of Article 2.01. Cuts and fills are not necessarily balanced. Any additional fill required shall be at the expense of the Contractor. Excess excavated material shall be deposited and spread on the site as directed, or removed from the site and disposed of without additional cost to the Owner.

B. Perform all site grading indicated on the Drawings. Control the grading in the vicinity of excavated areas so that the surface of the ground will be properly sloped to prevent water from running into the excavated areas. Such areas shall be kept reasonably dry at all times. Accumulated water shall be removed by pumping for such a period of time as required to allow the construction work to proceed.

C. Excavate for all work, to the lines and elevations as required. Side forms will be required for all concrete work unless omission of forms is requested by the Contractor and approved, in writing, by the Architect. Where omission of forms is

requested by the Contractor and approved by the Architect, the Contractor shall bear the cost of any additional concrete volume required beyond the minimum profiles and dimensions of the footing, wall, or pier as detailed. Where forms are required, excavations shall be made sufficiently large to permit placing and removal of forms, installation of utilities and inspection thereof.

D. Excavations shall not be carried below elevations shown on the Drawings without the written approval of the Architect.

E. All footing sub-grades shall be approved by the testing laboratory and the Architect before proceeding with the construction of piers, walls and footings. Bottoms of all footings shall be founded on competent, undisturbed soil or compacted structural fill at elevations indicated on the Drawings.

F. Sub-grades of all footings shall be level and clean of all loose rock, dirt and debris and free of standing water prior to acceptance for pouring concrete.

G. When unsuitable bearing soil is encountered at the sub-grade elevations indicated on the Drawings and the excavation is made to greater depth, the footings and foundation walls shall be extended to the lower elevation or concrete fill shall be installed by the Contractor as directed by the Architect without additional cost to the Owner.

H. If latent soil conditions are encountered at the sub-grade elevations indicated on the Drawings as determined by the Architect, the Architect may direct the removal of the unsuitable soil and extension of the footings and foundation walls or the installation of suitable compacted earth fill, or concrete fill. Payment for such authorized additional work shall be made in accordance with agreed upon unit prices or lump sum cost set forth in a written order.
   1. Frost susceptible material encountered to a depth of 3 ft. below the finish grade of paved areas, as determined by the testing laboratory, shall be removed and replaced to the extent necessary with approved compacted fill. Payment for such additional work shall be as specified above for latent soil conditions.

3.03 TRENCHING

A. General:
   1. Perform all trenching required for the installation of items where the trenching is not specifically described in other Sections of these Specifications.
   2. Make all trenches open vertical construction with sufficient width to provide free working space at both

sides of the trench and around the installed item as required for caulking, joining, backfilling, and compacting.

3. Depth:
   a. Trench as required to provide the elevations shown on the Drawings.
   b. Where elevations are not shown on the Drawings, trench to sufficient depth to give a minimum of fill above the top of the pipe as recommended by the Engineer.
4. Correction of faulty grades: Where trench excavation is inadvertently carried below proper elevation, backfill with approved material and then compact to provide a firm and unyielding sub-grade and/or foundation meeting the approval of the Architect and at no additional cost to the Owner.
5. Trench bracing:
   a. Properly support all trenches in strict accordance with all pertinent rules and regulations.
   b. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements whether on public or private property, will be fully protected from damage.
   c. If improvements are damaged, immediately make repairs and replacements necessary meeting the approval of the Architect and at no additional cost to the Owner.
   d. Arrange bracing, sheeting, and shoring so as to not place stress on portions of the completed Work until the general construction has proceeded far enough to provide sufficient strength.
6. Removal of trench bracing: Exercise care in the drawing and removal of sheeting, shoring, bracing, and timbering to prevent collapse or caving of excavation faces being supported.
7. Grading and stockpiling trenched material:
   a. Control the stockpiling of trenched material in a manner to prevent water running into the excavations.
   b. Do not obstruct the surface drainage but provide means whereby storm and waste waters are diverted into existing gutters, other temporary drains, or surface drains.

3.04 FILL AND COMPACTION

A. The Contractor shall perform all items of excavation and placing of fill and backfill as early in the construction as possible. Filled areas shall not be allowed to settle or prove themselves during the building construction period, and then be reshaped and re-graded at the end of that period. Flooding, ponding, or jetting with water shall not be employed.

B. Materials for fills shall consist of approved material, as specified in Article 2.01, obtained from the required excavation and approved material as may be required from off the site.

C. Place fill materials in horizontal loose layers and spread, mix and place in such a manner as to produce a uniform thickness of material. Placement shall start in the deepest area and progress approximately parallel to the finished grade. The thickness of each layer shall not exceed 9" loose measurement.

D. No fill material shall be placed on areas where free water is standing, on frozen subsoil areas, or on surfaces which have not been tested and approved by the Architect.

E. Compact each layer of fill with approved equipment to the maximum modified/standard Proctor densities at optimum moisture unless otherwise noted, as follows:
   1. 95 percent modified Proctor under building structure.
   2. 90 percent modified Proctor under ground-bearing building slabs, walks or platforms.
   3. For foundation backfill:
      a. 95 percent modified Proctor on interior side of walls.
      b. 90 percent standard Proctor on exterior side of walls below sidewalks.
      c. 90 percent standard Proctor on exterior side of walls in landscaped areas.
   4. 80 percent standard Proctor in landscaped areas and general grading.
   5. Under paved areas:
      a. 95 percent modified Proctor in the upper 3 feet.
      b. 90 percent modified Proctor to within 3 feet.
   6. All densities shall be determined in accordance with current ASTM D698 and ASTM D1557.

F. After completion of foundation walls and removal of forms, clean the excavation of all trash and debris before placement of backfill. Maintain symmetrical backfill loading and compact each layer with mechanical tampers or other approved equipment. In placing backfill take special care to prevent any wedge action, eccentric loading or overloading of the structure by equipment used in compacting the backfill material and to prevent damaging the walls.

G. Material shall not be compacted when the moisture varies more than plus or minus 3 percent from the optimum moisture content. A uniform moisture content will be required throughout the layers of fill material. Wetting or drying manipulation shall be required if necessary to accomplish this. Suspend compaction operations when, in the Architect's opinion, satisfactory results cannot be obtained because of rain or other unsatisfactory conditions.

H. In lieu of drying by manipulation of soil containing excessive moisture, the Contractor may, if approved by the Architect, employ hydrated lime, monohydrated lime or similar ingredients to reduce the plasticity index, or improve workability. Such ingredients shall be applied in a manner and quantity as recommended by the testing laboratory.

3.05 FINISH GRADING

A. Over sub-grade in lawn areas place topsoil to depth of 4". Topsoil shall be free from gravel, rocks, weeds, roots, etc. No mulch or black sand shall be used.

B. Spread topsoil evenly over lawn areas to be sodded or seeded. The finish surface shall be smooth and true to contours as indicated. Bring to elevation as required to allow installation of sod. Grades shall slope away from building at all points. Topsoil shall be loosened and graded as necessary to remove all ridges, depressions or other inequalities, and shall be raked to remove all extraneous material.

C. Do not place topsoil when the sub-grade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to planting or proper grading.

3.06 GRANULAR FILL BELOW SLAB-ON-GRADE

A. After the sub-grade has been approved, place granular fill below all on-grade concrete slabs in a layer 6" thick, unless otherwise shown. Where granular fill is more than 6" deep, place in maximum 6" layers. Compact each layer, one or more, with vibrating mechanical tamping equipment.
1. Compact granular fill as recommended in the Soils Report.

3.07 SOILS CONSULTANT

A. The excavating, filling and backfilling operations shall be under the direction of a soils consultant employed by the Contractor. The soils consultant shall be acceptable to the Architect.

B. The soils consultant shall determine the suitability of fill materials, acceptance of compacted fill layers and direct the removal of unsuitable materials.

C. The soils consultant shall verify the load bearing capacities of soils encountered at the design elevations. If the bearing capacities are below the design loads, the Contractor shall not proceed with the foundation work until corrective measures have been determined by the Architect.

D. The soils consultant shall determine the adequacy of drainage ditches and/or pumping equipment installed to maintain a reasonably dry building site.

E. The Contractor shall comply with the instructions of the soils consultant as to the aspects of the work described above and shall cooperate with the soils engineer in his performance of these duties.

F. The testing laboratory shall provide a technician in attendance during filling and compaction operations to perform tests specified. The technician shall be under the direction of the soils consultant.

3.08 TESTING SOIL

A. Type and frequency of field tests shall be as determined by the testing laboratory and the soils consultant. Unless otherwise determined minimum testing shall be as follows:
   1. Each type soil encountered shall be analyzed and classified.
   2. Field density tests shall be performed for every 2500 sq. ft. of each layer of compacted fill, or portion thereof.
   3. Field density tests shall be performed for every 100 lin. ft. of compacted backfill or portion thereof.
   4. Frost susceptibility analysis shall be performed for upper three feet of soil under exterior areas to be paved or covered by walks. Such tests shall be performed at the same rate as density tests. Fill requirements for such areas shall be reported.
   5. Bearing capacities of soils relative to design loads shall be verified.

END OF SECTION

SECTION 02281
TERMITE CONTROL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Soil treatment below slabs on grade, and external and internal perimeter foundations for subterranean insects (termites).

1.02 REFERENCES

A. Environmental Protection Agency (EPA): EPA - Federal Insecticide, Fungicide and Rodenticide Act.

1.04 QUALITY ASSURANCE

A. In addition to requirements of these specifications, comply with manufacturers instructions and recommendations for work, including preparation for substrate and application.

B. Engage a professional pest control operator, licensed in accordance with regulations of governing authorities having jurisdiction for application of soil treatment solution.

C. Material Packaging: Manufacturers labels and seals clearly identifying content.

1.05 WARRANTY

A. Furnish a five year written warranty certifying that applied soil poisoning treatment shall prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during warranty period, Contractor shall re-treat soil and other infested areas at his own expense.

B. In addition, provide the Owner an annually renewable termite inspection control contract (to be accepted at the Owners option), effective five years from date of original soil treatment, to assure necessary re-treatment and liability for termite damage.

PART 2 - PRODUCTS

2.01 SOIL TREATMENT SOLUTION

A. Toxicant Chemical: Water based emulsion, uniform composition, synthetic dye to permit visual identification of treated soil, of the chemical Dursban or other chemical specially formulated to prevent infestation by termites acceptable under regulations of the authorities having jurisdiction.

B. Mix Dilution: Dilute and mix toxicant chemical to manufacturer’s instructions. Fuel oil will not be permitted as a dilutent.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the surrounding structure and the conditions under which the treatment is to be applied and notify the Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with application until unsatisfactory conditions have been corrected.

B. Verify the soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

3.02 PREPARATION

A. Remove foreign matter which could decrease effectiveness of treatment on areas to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs if recommended by toxicant manufacturer.

3.03 APPLICATION

A. Treat soil within 12 hours before installation of vapor retarder under slab-on-grade or finish grading outside foundation walls.

B. Apply toxicant to soil at the following rates, using metered applicator:
   1. Apply four gallons of chemical solution per 10 lin. ft. to soil in critical areas under slab, including entire inside perimeter inside of foundation walls, along both sides of interior partition walls, around plumbing pipes and electrical conduit penetrating slab, and around interior column footers.
   2. Apply one gallon of chemical solution per 10 sq. ft. as an overall treatment under slab and attached slab areas where fill is soil or unwashed gravel. Apply one-and-a-half gallons of chemical solution to areas where fill is washed gravel or other coarse absorbent material.
   3. Apply four gallons of chemical solution per 10 lin. ft. of trench for each foot of depth from grade to footing, along outside edge of building. Dig a trench 6 inches to 8 inches wide outside of foundation to a depth not less than twelve inches. Punch holes to top of footing at not more than twelve inches on center amd apply chemical solution. Mix chemical solution with the soil as it is being replaced in trench.
   4. Apply one gallon per 10 sq. ft. of soil surface as an overall treatment, only where attached concrete platform and porches are on fill or ground.
   5. At hollow concrete masonry unit foundations or grade beams, treat voids at rate of two gallons per 10 lin. ft.,

poured directly into the hollow spaces.

6. At expansion joints, control joints, and areas where slabs will be penetrated, apply at a rate of four gallons per 10 lin. ft. of penetration.

3.04 RETREATMENT

A. Reapply soil treatment solution to areas disturbed by subsequent excavation or other construction activities following application.

3.05 PROTECTION

A. Post signs in areas of application warning workers that soil poisoning has been applied. Remove signs when areas are covered by other construction.

END OF SECTION

SECTION 02510
ASPHALT PAVING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Asphaltic concrete paving, including wearing binder and/or base course. Aggregate base course.

B.

1.02 REFERENCES

A. MS-2 Mix Design Methods for Asphalt Concrete and other hot mix types-The Asphalt Institute (AI).

B. MS-3 Asphalt Plant Manual-The Asphalt Institute (AI).

C. MS-8 Asphalt Paving Manual-The Asphalt Institute (AI).

1.04 QUALITY ASSURANCE

A. Perform all work in accordance with State of Arkansas Highway standards.

B. Mixing Plant to conform to State of Arkansas Highway Standards.

1.05 REGULATORY AND ENVIROMENTAL REQUIREMENTS

A. Conform to applicable codes for paving work. Do not place asphalt when base surface temperatures are less than 40 degrees F, or surface is wet or frozen.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Asphalt cement, aggregate for binder course and aggregate for wearing course to conform to Missouri Highway Department standards.

B. Mineral filler to be finely ground particles of limestone, hydrated lime or other mineral dust, free of foreign matter.

C. Provide SB-2 for base with compacted thickness of 6 inch min.

2.02 ASPHALT PAVING MIX

A. Use dry material to avoid foaming, mix uniformly.

B. Binder course to be 4.5 to 6 percent of asphat cement by weight in mixture in accordance with AI MS-2.

C. Wearing course to be 5 to 7 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify vase conditions under provisions of Section 01030. Verify that compacted granular base is dry and ready to support paving and imposed loads.

B. Verify grades and elevations of base are correct before starting work.

3.02 SUB-BASE PREPARATION

A. Grade and compact sub-base to conform to Section 02231.

3.03 TACK COAT PREPARATION

A. Apply tack coat in accordance with manufacturers' instructions and AI MS-19 State Highway Standards.

B. Apply tack coat to contact surfaces of curbs.

C. Coat surfaces of manholes, catch basin frames with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.

3.04 PLACING ASPHALT PAVEMENT

A. Place asphalt binder course within 24 hours of applying primer or tack coat.

B. Place binder course in 2 inch compacted thickness.

C. Place wearing course in 1 inch compacted thickness.

D. Place wearing course within two hours of placing and compacting binder course.

E. Compact pavement by rolling. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

3.05 TOLERANCES

A. Finish pavement shall have maximum flatness variation of ¼ inch measured with ten foot straight edge. Maximum thickness variation shall be within ¼ inch. Variation from true elevation within ½ inch.

3.06 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 5 days.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Formwork for building concrete.

B. Form ties and accessories.

1.02 RELATED SECTIONS

A. Section 02526 - Concrete Curbs and Gutters.

B. Section 03200 - Concrete Reinforcement.

C. Section 03300 - Cast-In-Place Concrete.

1.03 QUALITY ASSURANCE

A. Formwork shall comply with "Recommended Practice for Concrete Formwork" ACI 347R.

B. Design criteria/construction tolerances shall comply with ACI 301.

C. Anchor bolt tolerances shall comply with AISC "Code of Standard Practice" current edition.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Wood Form Sheathing:
   1. Finish No. 1 (Concealed Below Grade Concrete) : 3/4" exterior plywood, B-B Concrete Form Class II, PS-1.
   2. Finish No. 2 (Exposed Non-Architectural concrete): Same as for Finish No. 1.

B. Form Ties: Internal disconnect, or snap type, leaving metal no closer than 1" from surface of concrete or a hole no larger than 3/4" in diameter.

C. Form Coating: A commercial product to facilitate stripping without staining or damaging concrete or impairing future concrete treatment.

PART 3 - EXECUTION

3.01 CONSTRUCTION DETAILS FOR FORMWORK

A. Forms shall conform to shape, lines and dimensions shown on the Drawings, be designed to resist the pressure and weight of the concrete, be properly tied and braced or shored so as to

maintain position and shape, and be sufficiently tight to prevent leakage of mortar. Forms shall be designed and constructed to facilitate easy removal without damage to exposed surfaces, and to provide smooth concrete surfaces free of off-sets. Corners shall be true to lines and profiled as detailed. Form joints which will be exposed to view shall be kept to a minimum and shall be located symmetrically within each modular unit.

B. Before reinforcing steel is set, wood forms shall be coated with an approved non-staining form oil, or wet with water (Except in freezing weather). Metal forms shall be coated with an approved non-staining rust preventive form oil. Stained forms shall not be used.

C. Provide temporary openings to facilitate cleaning and inspection immediately before depositing concrete.

D. Form material is subject to Architect's approval before construction of forms. Forms for exposed concrete may be reused only if the surfaces have not absorbed moisture and have not splintered, warped, discolored, stained, rusted or peeled, subject to the Architect's approval.

E. Exposed corners shall be chamfered unless otherwise shown. Where corners are chamfered, polyvinyl chloride or neoprene extruded cornerstrips shall be inserted in the forms. Corners which abut masonry walls shall not be chamfered. Splices and joints in chamfer strips shall be in accordance with the manufacturer's instructions.

F. Place bulkheads where end of days work requires a joint in a wall, beam or slab. Reinforcing steel shall extend through the bulkhead. Joints shall be keyed for 1/2 of the member thickness unless otherwise directed. Location of bulkheads shall be as approved by the Architect.

G. Form openings in concrete as shown on the Drawings or required by other trades to accommodate their work. Accurately place and securely support items to be built into forms.

H. Set and build into the Work the anchorage devices and other imbedded items required for other work that is shown on the Drawings attached to, or supported by, cast-in-place concrete. Coordinate location and placement with other trades.

3.02 FORM REMOVAL

A. Removal of forms and shoring shall be in accordance with ACI 318.

B. Exercise special care when removing forms from exposed concrete surfaces.

C. Results of job-cured cylinders per ASTM C31 shall be used as evidence that concrete has obtained required strength to allow removal of formwork.

3.03 RESHORES

A. Construction loads exceeding the structural design loads shall not be supported upon any unshored portion of the structure.

3.04 TOLERANCES

A. Forms shall be designed, constructed and maintained, and concrete shall be placed so as to ensure completed concrete work within the tolerance limits set forth in ACI 347R.

3.05 FIELD QUALITY CONTROL

A. Check the lines and levels of the completed formwork before concrete is placed, and make whatever corrections or adjustments to the formwork necessary to correct deviations from the specified tolerances.

B. Check formwork during the placement of the concrete to ensure that the forms, shores, tie rods and clamps have not been moved from the established line, level and cross section by concrete pouring methods and equipment.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Steel reinforcing bars.

B. Welded wire fabric.

C. Accessories.

1.02 RELATED SECTIONS

A. Section 03100 - Concrete Formwork.

B. Section 03300 - Cast-In-Place Concrete.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Shop Drawings: Fabrication and placing drawings for reinforcing steel, conforming with the ACI SP-66. Include bar bending diagrams and construction joint locations.

1.04 QUALITY ASSURANCE

A. The reinforcement work shall conform with the following except when in conflict with the building code in force; in such event the building code will govern.
   1. Specifications for Structural Concrete for Buildings, ACI 301.
   2. Details and Detailing of Concrete Reinforcement, ACI 315.
   3. Building Code Requirements for Reinforced Concrete, ACI 318.
   4. Structural Welding Code - Reinforcing Steel, AWS D1.4.
   5. CRSI Manual of Standard Practice MSP current edition.

B. Furnish 4 copies of the manufacturer's certificates for mill tests of reinforcing steel.

1.05 DELIVERY, STORAGE AND HANDLING

A. Properly label bars with weatherproof tags to facilitate identification.

B. Store reinforcing steel on supports above ground level. Keep covered with tarpaulins if there is a delay in use. Immediately remove damaged and otherwise unsuitable material, when so determined, from the site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. New-Billet Steel Bars: ASTM A615, Grade 60, unless otherwise shown.
   1. Comply with ACI 301, Article 5.4.1 and CRSI MSP 1, Chapter 7 for fabrication tolerances.
   2. Shop fabricate reinforcing bars.
   3. Use bending procedure which does not damage steel.

B. Welded Wire Fabric: ASTM A185.

C. Accessories: Provide bar supports and other accessories necessary to hold bars in proper position while concrete is being placed.

2.02 FABRICATION

A. General: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI "Manual of Standard Practice". In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material. Reinforcing steel shall be of the yield strength specified or scheduled on the Drawings.

B. Unacceptable Materials: Reinforcement with the following defects will not be permitted in the work.
   1. Bar lengths, depths, and bends exceeding specified fabrication tolerances.
   2. Bend and kinks not indicated on Drawings and final shop drawings.
   3. Bars with reduced cross-section due to excessive rusting and other causes.

PART 3 - EXECUTION

3.01 PREPARATION

A. Clean reinforcement to remove loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.

3.02 INSTALLATION

A. Place reinforcement according to the approved placement drawings. Use sufficient bar supports, ties, anchors and other accessories to hold bars securely in place.
   1. Splice reinforcing bars only where indicated on the Drawings.
      a. Splices shall be lapped unless otherwise indicated on the Drawings.
   2. Provide sufficient numbers of supports and of strength to

carry reinforcement. Do not place reinforcing bars more than 2" beyond the last leg of continuous bar supports. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.

3. Where chairs and other accessories are in contact with the formwork of exposed concrete, they shall be stainless steel legged, or plastic tipped unless otherwise approved by the Engineer.

B. Install welded wire fabric in accordance with ACI 301, Articles 5.7.4, and as specified herein. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least 1 (one) full mesh and lace splices with 16 gage wire. Do not make end laps midway between supporting beams, or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps in either direction.

C. Welding of Reinforcing Steel:
1. Welding of reinforcing steel, metal inserts and connections shall be according to AWS D1.4.
2. Low hydrogen welding electrodes shall be used.
3. Proper pre-heat shall be used in welding high-strength steels.
4. Where welding of reinforcing steel is specifically detailed on the Drawings, great care shall be exercised to assure no reduction of the cross-sectional area of the reinforcing steel. No other welding of reinforcing steel shall be permitted without prior written authorization by the Engineer.
5. Tack welding is not permitted for assembly.

D. Field Adjustments: Adjust bar locations to avoid interference with inserts, sleeves and other reinforcing. When adjustment exceeds 25 percent of spacing within the plane or 1 (one) bar diameter perpendicular to the plane of the reinforcing, the layout shall be reviewed by the Structural Engineer.
1. No bars shall be placed while concrete is being poured.
2. No bars shall be bent after being partially embedded in hardened concrete.

E. Coordinate and cooperate with other trades to ensure that reinforcing is in proper place and that pipes, sleeves, conduit, anchors, bolts, flashings, caulking grooves, slips and other inserts of other trades to be cast into concrete are securely placed before concrete is placed.

F. The Structural Engineer at the Engineer's discretion may review reinforcing prior to placing concrete. Notify Structural Engineer of intent to place concrete at least 3 working days prior to placing.

3.03 TOLERANCES

A. Reinforcing shall be protected by the following minimum thicknesses of concrete, unless otherwise indicated on the Drawings:
   1. Concrete against ground without forms: 3" (bars).
   2. Concrete against ground without forms: 2" (mesh).
   3. Concrete against ground with forms: 2"
   4. Concrete exposed to weather: 2"
   5. Columns and beams not exposed to ground or weather: 1-1/2"
   6. Walls not exposed to ground or weather: 1"
   7. Slabs not exposed to ground or weather: 3/4"

B. Place temperature reinforcing for slabs-on-grade at the center of the slab.

C. Place welded wire fabric on slab form at the center of slab.

END OF SECTION

SECTION 03300
CAST-IN-PLACE
CONCRETE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Cast-in-place concrete work, including:
   1. Concrete materials.
   2. Placing.
   3. Curing and sealing.
   4. Patching and repairing.
   5. Grout for inserts, bolt and base plates set in concrete.
   6. Moisture retarder.
   7. Granular cushion below slabs.

1.02 RELATED SECTIONS

A. Section 02200 - Earthwork.

B. Section 02526 - Concrete Curbs and Gutters.

C. Section 03100 - Concrete Formwork.

D. Section 03200 - Concrete Reinforcement.

E. Section 04100 - Mortar and Masonry Grout.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Aggregate test reports and mix designs shall be submitted to the Architect and the Structural Engineer in duplicate for approval at least 14 days prior to placing concrete.
   2. Compressive strength test reports as specified in the article on Field Quality Control.

1.04 QUALITY ASSURANCE

A. The concrete work shall conform with the following except when in conflict with the building code in force; in such event the building code shall govern.
   1. Specifications for Structural Concrete for Buildings, ACI 301.
   2. Guide for Measuring, Mixing, Transporting, and Placing Concrete, ACI 304R.
   3. Building Code Requirements for Reinforced Concrete, ACI 318.
   4. Standard Specification for Cold Weather Concreting: ACI 306.1 when freezing conditions or mean daily temperature below 40 degrees F. is encountered.
   5. Hot Weather Concreting: ACI 305R when maximum daily temperature exceeds 85 degrees F. or rapid drying conditions exist. (Evaporation rate exceeds 0.15 lb./s.f./hr., per Figure 2.1.5).

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store material at the Project site in such a manner as to prevent damage. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. Wrapped, or bundled material shall bear the name of the manufacturer and the product. Damaged and otherwise unsuitable material when so determined shall be immediately removed from the Project site.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type I normal Portland cement; or Type III (High-early strength cement) if approved by the Architect. Cement shall be uniform in color and from a single source.

B. Aggregates:
   1. For normal weight concrete exposed to weather, aggregates shall be:
      a. Coarse aggregate shall be crushed and graded limestone or approved equivalent conforming to ASTM C33-86, Class Designation 5S.
      b. Fine aggregate shall be natural sand conforming to ASTM C33.
   2. For all other normal weight concrete, aggregates shall conform to ASTM C33.
   3. Coarse aggregate shall be nominal maximum sizes indicated below, conforming to ASTM C33, Table 2:
      a. Footings: 1-1/2"
      b. Slabs less than 2" thick and fill for masonry/ICF: 3/8".
      c. All other members: 3/4".

C. Water: Clean, free from deleterious substances.

D. Admixtures: Concrete admixtures shall comply with ASTM C494 (Water Reducing) or ASTM C260 (Air Entraining), produced by recognized manufacturers, subject to Architect's approval.
   1. Air Entraining Admixture:
      a. "Air Mix" (The Euclid Chemical Company)
      b. "MB-VR" or "Micro Air" (Master Builders Technologies)
      c. "Darex" (W.R. Grace & Co.)
      d. "Sika AER" (Sika Chemical Company)
      e. Add only to normal portland cement concrete to meet requirements specified for air content.
   2. Water Reducing Admixture: Type A, containing not more than 0.1 percent chloride ions added during manufacture:
      a. "Eucon WR-75" (The Euclid Chemical Co.)

b. "WRDA with Hycol" (W.R. Grace & Co.)
c. "Pozzolith" 122N or 344N (Master Builders Technologies)
d. "Plastocrete" (Sika Chemical Company).

3. Water Reducing, Retarding Admixture: Type D. When high temperatures, placing, or humidity conditions dictate:
   a. "Daratard HC" (W. R. Grace & Co.)
   b. "Eucon Retarder-75" (The Euclid Chemical Co.)
   c. "Pozzolith 100-XR" (Master Builders Technologies)
   d. "Plastiment" (Sika Chemical Company).
4. Water Reducing, Accelerating Admixture: Types containing not more than 0.1 percent chloride ions when increased initial set is required without corrosive effect on metals:
   a. "Accelguard 80" (The Euclid Chemical Co.)
   b. "Dara Set Accelerator" (W. R. Grace & Co.)
   c. "Pozzutec 20", (Master Builders Technologies).
5. Calcium chloride **SHALL NOT BE USED**, except as allowed in the manufacturing of the admixture specified.

2.02 OTHER MATERIALS

A. Bonding Agent: (Epoxy type), 100 percent solids:
   1. "BurkEpoxy LV" (The Burke Co.)
   2. "Duralbond" (Dural International Corp.)
   3. "Euco Epoxy #452", (The Euclid Chemical Company)
   4. "Concresive Liquid LPL" (Master Builders Technologies)
   5. "Epobond" (L & M Construction Chemicals Co.)
   6. "Sikadur Hi-Mod" (Sika Chemical Co.).

B. Patching and Surfacing Compound: (Epoxy type), 100 percent solids:
   1. "BurkEpoxy Mortar" (The Burke Co.)
   2. "Flexocrete" (dry,or damp surface), (Dural International Corp.)
   3 "Euco Epoxy #460 Mortar" (dry or damp surface), (The Euclid Chemical Company)
   4. "Epopatch" (L & M Construction Chemicals Co.
   5. "Concresive 1470" (dry or damp surface), (Master Builders Technologies)
   6. "Sikadur Lo-Mod Mortar" (dry or damp surface), (Sika Chemical Co.)

C. Moisture-Retaining Cover: One of the following, complying with ASTM C171.
   1. Waterproof paper.
   2. Polyethylene film.
   3. Polyethylene-coated burlap.

D. Liquid Membrane Curing and Sealing Compound: ASTM C309, Type 1, acrylic based, 18 percent minimum solids for use on vertical and horizontal surfaces, guaranteed not to affect bond of applied finishes:
   1. "Spartan-Cote 20, Cure-Seal-Hardener" (The Burke Co.)
   2. "Dress & Seal 18" (L&M Construction Chemicals Co.)
   3. "Kur-N-Seal 0800" (Sonneborne Building Products Division, ChemRex, Inc.).

E. Joint Materials
   1. Expansion Joint Filler: ASTM D1751; non-extruding type, fiber with asphalt binder.

F. Grout: Non-shrink, non-metallic, non-gaseous type, pre-mixed grout complying with CRD-C 621, for setting inserts, bolts and base plates:
   1. "Burke Non-Ferrous, Non-Shrink Grout" (The Burke Co.)
   2. "Euco N-S" (Euclid Chemical Co.)
   3. "Crystex' (L&M Construction Chemicals Co.)
   4. "Set Grout" (Master Builders Technologies).

G. Moisture Retarder: Fungi resistant polyethylene sheet conforming to PS 17, not less than 6 mil thick and sealed with adhesive-backed polyethylene tape.

2.03 PROPORTIONING AND MIXING CONCRETE

A. General:
   1. Employ the services of an independent testing laboratory to test the proposed aggregate, and to design concrete mixes for each type of concrete required.
   2. The mixes shall be designed in accordance with ACI 301, Section 3.8. The approved mix designs shall be used as long as aggregate characteristics remain unchanged. Upon significant changes in aggregate, prepare new mix designs.

B. If no design strength is shown, provide design strength of 4000 psi at 28 days.

C. Provide air entrained concrete for exterior work including platforms and slab-on-grade by adding air-entraining admixture to the normal portland cement concrete mix. The total air content shall be 6 percent $\pm$ 1 percent.

D. Ready mixed concrete shall conform with ASTM C94.

E. Slump shall be determined in accordance with ASTM C143 as follows:
   1. 3" but not more than 4" in field: For footings and walls.
   2. 2-1/2" but not more than 3-1/2" in field: For slab-on-grade.
   3. 6" but not more than 8" in field: Fill for masonry bond beams, cores of reinforced masonry walls, and ICF’s.
   4. Concrete with slump which exceeds the limits specified

shall be rejected.

F. Concrete exposed to the weather shall have a water-cement ratio of not more than 0.35 when strength data from field experience or trial mixtures are not available.

PART 3 - EXECUTION

3.01 PREPARATION

A. Coordinate concrete work with the work of the other trades to allow reasonable time to set sleeves, inserts and other accessories, which must be in position before concrete is placed. In general, place electrical conduits which do not exceed 2" in diameter (o.d.) between the upper and lower third of the thickness of the concrete in which it is embedded. Do not place conduits in concrete closer together than 3 diameters on centers, except at points of crossing and at cabinet boxes.

B. Install moisture retarder, under all interior concrete slabs, sandwiched between 2 equal lifts of granular fill (total thickness as shown on Drawings). Lap joints not less than 6" and seal with adhesive-backed polyethylene tape.
   1. Avoid construction traffic both wheeled and pedestrian type across moisture retarder after installation insofar as practicable to avoid damage to moisture retarder.
   2. Protect moisture retarder after reinforcement is installed where consistent or heavy construction traffic is anticipated prior to the placement forms of concrete. Use plywood sheets or dimensioned lumber planks as necessary.
   3. After careful exmaination of the moisture retarder, repair tears, holes and punctures in moisture retarder with same tape used to seal seams, then place second lift of granular fill over moisture retarder.
   4. Compact granular fill as recommended in the Soils Report.

3.02 PLACING CONCRETE

A. Place concrete immediately after mixing. Deposit concrete in uniform, horizontal layers not more than 24" deep work around all reinforcing and in corners of forms. Properly spade and puddle by use of rods, shovels and hand spades, and agitate by means of internal and/or external vibrators to obtain densest possible concrete without over-vibrating to the point where segregation results. Deposit concrete continuously until completion of each section or unit.
   1. Concrete transported by truck mixer or agitator shall be completely discharged within 90 minutes (60 minutes for hot weather concreting) after water has been added to the cement or cement has been added to the aggregates.

B. Clean construction joints and moisten just before placing

additional concrete.

C. In cold weather, concrete shall not be placed when temperature is, or is predicted to be within the following 48 hours, below 40 degrees F. unless proper provisions have been made for heating and protecting concrete in accordance with ACI 306.1.

D. In hot weather, to prevent the development of high temperatures in fresh concrete, concrete shall be protected in accordance with ACI 305R.

E. Slabs on fill shall not exceed 40 feet in any horizontal direction, or an area of 1,000 s.f. placed in strip sequence unless otherwise shown on the Structural Drawings or approved by the Structural Engineer. Minimum of 24 hours shall elapse between the placing of adjacent units. Provide construction joints between units in accordance with the typical details shown.

F. Provide adequate runways, chutes, and other means of conveying concrete in place. Use chutes or tremies for placing concrete where a drop of more than 5 feet is required.

3.03 FINISHING CONCRETE

A. Finish Numbers: The finishes required on concrete surfaces may be identified as follows:
   1. Finishes for Formed Surfaces:
      a. Finish No. 1: For below-grade concrete against which backfill will be placed and above grade concrete which will not be exposed to view.
      b. Finish No. 2; Exposed Non-Architectural Concrete: For concrete surfaces exposed to view in service and utility spaces and surfaces to be covered by other finishes.
   2. Finishes for Slabs:
      a. Unless otherwise noted concrete slabs shall receive a power steel troweled finish. Final hand troweling shall be required to remove imperfections left by troweling machines, and to bring the surface to a dense, smooth finish.
         1) Where ceramic or quarry tile is specified for thin-set installation, follow trowelling immediately with a fine broom finish.
      b. Finish concrete slabs to proper elevations to ensure that all surface moisture will drain freely to floor drains, and that no puddle areas exist. It is the intent of the elevations shown on the Drawings to create this situation. During the finishing operations, the Contractor shall pay particular attention to this criterion, and shall make all efforts to obtain this. Cost of corrections to provide for this positive drainage will be the

responsibility of the Contractor.

c. Sidewalks: Apply broom finish generally perpendicular to the direction of travel.

3.04 PATCHING OF CONCRETE

A. Finishes No. 1 and No. 2:
1. Apply epoxy type bonding agent and patch all form tie holes, aggregate pockets, honeycomb and defective areas as required with 1:2 portland cement-sand mortar.

3.05 CURING AND PROTECTION

A. Protect concrete work from drying out by covering with waterproof paper, polyethylene film, polyethylene-coated burlap, or a coating of approved membrane curing compound. Curing methods are subject to Architect's approval. Perform slab curing as soon as possible after final finishing operations are complete, and in any event within 2 hours. When forms are removed from formed concrete, exposed concrete surfaces shall be wet with water immediately and kept moist until application of curing compound.
1. Moisture-Cover Curing:
a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Extend cover material over edges of slab and secure. Seal around all penetrations in slab. Immediately repair holes or tears during curing period using cover material and waterproof tape.
2. Compound Curing:
a. Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's instructions. Recoat areas subjected to heavy rainfall occurring within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
b. Curing compounds, if used, shall be compatible with floor finishes subsequently applied or installed.

3.06 SEALING CONCRETE

A. General: Apply sealing compounds specified to interior concrete floors where scheduled in accordance with manufacturers instructions and as specified herein.

B. Interior Concrete: Apply 2 coats of sealer (1 coat if initially membrane cured) to interior floors which will be exposed to view in the finished work. Sealer shall be applied as late in the construction period as possible to avoid damage to application by construction related activities.

3.07 EMBEDDED ITEMS

A. General: Set and build into work, anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached.

3.08 GROUTING

A. Grout structural base and bearing plates as soon as practical and before significant load is placed on bearing members. Mix, place and cure grout in accordance with the manufacturer's directions.

3.09 JOINTS

A. Perimeter isolation for slabs on grade:
   1. Provide asphalt impregnated fiber board, 1/2" thick, full depth of slab.

B. Control joints in exterior sidewalks and platforms:
   1. Locate maximum 5'-0" o.c. or as indicated on the Drawings.
   2. Saw cut 1/8" x 1/3 the slab depth, or
   3. Form by cutting slab with steel "T" bar 1/3 the slab depth.

C. Expansion joints in exterior sidewalks and platforms:
   1. Install expansion joint material behind curb at abutment to sidewalks, curb returns, adjacent structures and maximum 25' -0" o.c. in sidewalks and platforms.
   2. Place top of expansion joint material 1/2" below curb or slab surface.

3.10 FIELD QUALITY CONTROL

A. Testing laboratory shall make the following tests:
   1. Perform compression strength tests on concrete specimens taken from the forms immediately after placing. Perform a compression strength test for each pour in excess of 4 c.y. of each class of concrete but in no case less than 1 (one) test per day. Make 1 (one) additional set of cylinders for each additional 50 c.y. (or fraction thereof) of concrete in excess of the first 25 c.y. of concrete poured in a day. Each set of specimens shall consist of 4 standard 6 x 12 cylinders taken in accordance with ASTM C31. Tests shall be in accordance with ASTM C39.

a. In cases where samples have not been taken or tests conducted as specified or the strength of the laboratory test cylinders for a particular portion of the structure fails to meet the requirements of ACI 318, Section 5.3, for evaluation of concrete strength, the Architect shall have the right to order compressive and flexural test specimens taken from the hardened concrete according to ASTM C42, load test according to ACI 318, Chapter 20, or such other tests as may be necessary to clearly establish the strength of the concrete. Such test shall be at no additional cost to the Owner.

2. Perform slump tests in accordance with ASTM C143. Furnish slump cone at the site. Perform a minimum of 1 test per set of cylinders.
   a. Concrete pumped-in-place shall be tested for slump at the time of placement at the discharge end.
   b. Concrete exhibiting slump exceeding that specified shall be rejected and removed from the site as directed by the testing laboratory.
3. Perform air-entrainment tests in accordance with ASTM C173, or ASTM C231 as applicable. Furnish and maintain equipment for testing air content at the site. Perform a minimum of 1 (one) test per set of cylinders of air entrained concrete. Concrete samples tested for slump shall not be used for air-entrainment tests.
4. Test concrete temperature hourly when air temperature is 40 degrees F. and below, when 80 degrees F. and above, and each time a set of compression test specimens is made.

B. If, in the opinion of the Architect, foregoing tests indicate concrete strengths below those required, or visual defects indicate concrete of poor quality has been placed, additional tests shall be made and reported as directed by the Architect at no additional cost to the Owner.

3.11 PROTECTION

A. Until this portion of the work is completed, remove water in the areas of construction that may interfere with the proper performance of the Work. Provide sumps, pumps, wellpoints, electric power and attendance required; furnish on a 24-hour basis, if necessary.

B. During freezing and near-freezing weather, concrete shall be protected from freezing, and minimum temperatures shall be maintained for curing in accordance with ACI 306.1, "Standard Specification for Cold Weather Concreting". Do not place on frozen ground and in forms containing ice, snow or frost.

C. No concrete shall be placed without the permission of the Architect when the outside air temperature is above 80 degrees F. or is expected to rise above 80 degrees F. If permission is granted, the concrete shall be

placed and cured according to the requirements of ACI 305R "Hot Weather Concreting".

END OF SECTION

SECTION 04100
MORTAR AND
MASONRY GROUT

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Mortar for:
   1. Concrete unit masonry.
B. Grout for bond beams and concrete masonry unit fill for cores and reinforced unit masonry.

1.02 RELATED SECTIONS

A. Section 04200 - Unit Masonry: For installation.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Manufacturer's Literature: Materials description of cement and lime.
   2. Test Reports: Test reports on cement and mortar indicating compliance with specified standards.
      a. Test the water-soluble alkali content of the cement used in the mortar in accordance with ASTM C114, or provide suitable certification furnished by the manufacturer of the cement, to establish that total water-soluble alkali content does not exceed 0.1 percent of the alkalies present.
      b. Field tests in accordance the article on Field Quality Control .
   3. Mortar Design Mix: For property specification and off-site preblended dry mortar (each type if more than one type used) submit a laboratory design mix conforming to the specification requirements utilizing the materials proposed for the work.
      a. Indicate mix design proportions by weight of all materials.
      b. Indicate laboratory tests for compression strength at 28 days in accordance with ASTM C109.

1.04 DELIVERY, STORAGE AND HANDLING

A. Accept delivery of material only in an undamaged condition; handle and store above ground and under weather-tight cover. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. Store admixtures to prevent contamination or damage from excessive temperature changes. Stockpile aggregates to prevent contamination from foreign materials. Remove damaged and otherwise unsuitable material, when so determined, from the Project site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Portland Cement: ASTM C150, Type I, gray and white non-staining. Masonry cement is NOT allowed.

B. Hydrated Lime: ASTM C207, Specification for Hydrated Lime for Masonry Purposes, Type S, containing no air entrainment.

C. Aggregate for Mortar: ASTM C144, natural sand.

D. Water: Clean, free from deleterious amounts of acids, alkalies and organic materials.

E. Admixtures shall not be used in mortar, unless approved by the Architect.

F. Color Pigments: Pure, chemically inert, unfading, alkali-fast, inorganic, finely ground, specially prepared natural and synthetic iron oxides and chromium oxides with a record of satisfactory performance for use in masonry mortars:
   1. ?True Tone Mortar Colors≅ (Davis Colors, a Subsidiary of Rockwood Industries, Inc.)
   2. ?DCS Mortar Colors≅ (DCS Color &Suppy Co., Inc.)
   3. ?Concentrated Mortar Colors≅ (Tamms Industries Co.)

2.02 MORTAR SPECIFICATION

A. Mortar Proportions by Volume Specification: ASTM C270 and as modified herein:

Mortar	Portland	Hydrated Lime	Aggregate Ratio (Measured in Damp, Loose Conditions)
M	1	1/4	Not less than 2-1/4 and not more than 3 times the sum of the separate volumes of cementitious materials
S	1	Over 1/4 to 1/2	

B. Mortar Property Specifications: ASTM C270 and as modified herein. Average laboratory tested compressive strengths at 28 days, ASTM C109; Portland cement-lime mortars:

Type	Compressive Strength	Water Retention Min. %	Air Content Max.%	AggregateRatio (Measured in Damp, Loose Conditions
M	2500 psi	75	12	Not less than 2-1/4 and not more than 3-1/2 times
S	1800 psi	75	12	the sum of the separate volumes of cementitious materials.

2.03 MIXING

A. Mix cementitious materials and aggregate in a mechanical batch mixer for at least 3 minutes and not over 5 minutes with the maximum amount of water to produce a workable consistency. Re-temper mortar to replace water lost by evaporation, but not after mortar has begun to set. Use mortar within 2-1/2 hours after mixing.

2.04 GROUT

A. Grout for Reinforced Concrete Unit Masonry Walls and Bond Beams: 1 part portland cement, 2-1/2 part fine aggregate, 2 parts pea gravel and water.
1. Compression Strength: 3,000 psi at 28 days.
2. Slump: 9 to 10 inches.

PART 3 - EXECUTION

3.01 MORTAR USES

A. Type M: Walls in contact with earth and walls below grade.

3.02 INSTALLATION

A. Refer to Section 04200 for installation.

3.03 FIELD QUALITY CONTROL

A. General requirement for testing shall be as specified in Section 01410. Specific test and inspection requirements shall be as specified herein.

B. Test mortar in accordance with ASTM C780:
1. Perform tests on mixed mortars for each type of mortar and for each day mortar is used to determine consistency in compressive strength and not compliance with laboratory compressive strength requirements.

2. For off-site prepared preblend dry mortars, select random dry samples from each delivery, prepare laboratory controlled samples, and test for design compressive strength and consistency in compressive strength.
3. Test each specimen sample at 3 days, 7 days and 28 days.

END OF SECTION

SECTION 05120
STRUCTURAL
STEEL

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Steel elements of the structural steel frame essential to support the design loads.

1.02 PRODUCTS FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

A. Anchor bolts and embeds.

1.02 RELATED SECTIONS

A. Section 03300 - Cast-In-Place Concrete: For grouting of base plates, and installation of anchor bolts and embeds for anchoring structural steel to concrete.

B. Section 04200 - Unit Masonry: For installation of anchor bolts and embeds for anchoring structural steel to masonry.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Shop Drawings: Complete fabrication and erection details and schedules.

      a. Shop Drawings shall have been thoroughly checked by fabricator before being submitted for review. Review is precautionary measure only and shall not relieve fabricator of full responsibility of correctness of materials, sizes, dimensions and details.
      b. If structural sections and other details indicated on Drawings cannot be readily obtained, substitution of sections and other details of equal strength which conform to requirements of design may be made only if approved.
      c. Fabrication shall not proceed until shop drawings have been reviewed. Fabrication, assembly and erection shall conform to reviewed shop drawings.
      d. Shop Drawings shall be signed by a registered structural engineer, registered in the state where the project is located.

1.05 QUALITY ASSURANCE

A. Comply with AISC Manual, Ninth Edition.
   1. "Specification for Structural Steel Building - Allowable Stress Design and Plastic Design".

B. Comply with AISC Manual Seventh Edition.
   1. "A Guide to the Shop Painting of Structural Steel".

2. "Specifications for Architecturally Exposed Structural Steel".

C. "Code of Standard Practice for Steel Buildings and Bridges".
1. Paragraph 4.2.1 of the above code is hereby modified by deletion of the following sentence: "This approval constitutes the Owner's acceptance of all responsibility for the design adequacy of any connections designed by the fabricator as a part of his preparation of these shop drawings".

D. "General Requirements for Rolled Steel Plates, Shapes, and Bars for Structural Use", ASTM A6.

E. Welding shall comply with American Welding Society "Structural Welding Code - Steel" AWS D1.1.

F. "Specifications for Assembly of Structural Joints Using High Strength Steel Bolts" as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

1.06 DELIVERY, STORAGE AND HANDLING

A. Fabricate for delivery sequence which will expedite erection and minimize field handling. Identify pieces with suitable mark conforming to erection drawings.

B. Deliver structural steel to the Project site and store to avoid damage and distortion of material. Material damaged due to mishandling shall be replaced at no additional cost to the Owner.

1.07 SITE CONDITIONS

A. Do not perform welding below 0 degrees F. Preheat material to be welded and maintain interpass temperatures as required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural Steel: ASTM A36.

B. Structural Tubes: ASTM A500, Grade B.

C. Welding Electrodes: AWS Specifications, Serial Designation A233.

D. High Strength Bolts: ASTM A325N.

E. Anchor Bolts, Nuts and Washers: Threaded rod stock, ASTM A307.

F. Shop Coat Paint: Fabricators standard rust-inhibiting primer containing no lead-bearing components and meeting current Federal and State regulations concerning lead in paint, and similar to #4080 Red Oxide Zinc Chromate Primer (Hentzen Coatings, Inc.); for interior, normally dry environment.
   1. For more severe exposure than those specified above and for architecturally exposed steel, submit proposed primer with shop drawings.

G. Bituminous Coating: ASTM D1187 asphalt emulsion.

2.02 FABRICATION

A. Take field measurements as required to verify and supplement dimensions shown on Drawings.

B. Material shall be properly marked and match-marked where field assembly is required. The sequence of shipments shall be necessary as to expedite and minimize the field handling of material.

C. Members shall be cambered upward where shown on the Drawings and be so marked for clear identification.

D. Built-up sections assembled by welding shall be free of warpage, and all axes shall have true alignment.

E. Welds not specified shall be continuous fillet welds, using not less than the minimum fillet as specified by AWS.

F. Provide anchor bolts and embedded plates for anchoring structural steel to supporting concrete and masonry. Furnish detailed plans showing exact locations of all bolts to be built into concrete and masonry as soon as possible. Furnish templates as required.

G. Connections:
   1. Field connections shall be bolted, unless otherwise shown on Drawings. Field welded connections shall be used only where specifically shown on Drawings or with Structural Engineer's approval.
   2. Shop connections may be welded or bolted with high strength bolts at fabricator's option. Shear connections shall be welded or bolted with high strength bolts.

   3. High strength bolts shall be installed in strict compliance with AISC Specifications and ASTM requirements for installation of bolts.
   4. Field and shop welds shall be by certified welders only. Certificates should be available for inspection by

Architect.

5. Connections not specifically shown shall fully develop critical load for member being connected.
6. Bolts where used shall have cut washers under nuts and no threads allowed to bear on parts being connected.
7. Bearing ends of columns and trusses shall be milled or sawed for true bearing on base and bearing plates. Rough bearing ends shall not be used.

2.03 CLEANING AND SHOP PAINTING

A. Steel shall be cleaned of rust, mill scale, dirt and foreign matter before application of shop coat of paint.

B. Paint structural steel with 1 (one) smooth coat of primer specified. Apply 2 coats on surfaces not accessible after erection.

C. Shop coat shall result in a 2 mil (minimum) dry film thickness.

D. Steel items to be embedded in concrete and steel items to be fireproofed shall not receive shop coat. Steel to receive field welded connections of primary structural importance shall not receive shop coat of paint but shall be painted in field instead.

E. Hand clean and solvent clean unpainted and damaged shop coat areas and touch-up with a compatible shop coat primer.

F. Apply 2 heavy coats of bituminous coating to steel surfaces in contact with soil.

PART 3 - EXECUTION

3.01 ERECTION

A. Material stored at the Project site shall not exceed design loads on structures so the members will not be distorted or otherwise damaged; and shall be protected against corrosion or deterioration.

B. Confer with other trades and procure necessary templates and other information required to establish number, size and location of holes or other details necessary for attachment of items to structural steel.

C. Burning shall not be used to form holes, enlarge holes or to otherwise modify connections. No member shall be altered in field unless approved in writing by Engineer.

D. Temporary bracing throughout erection and construction shall be introduced wherever necessary to take care of loads to which structure may be subjected including equipment and operation of

same. Wherever piles of material, erection equipment and other loads are carried during erection, proper provisions shall be made to safely support these abnormal loads.

E. Members shall be cut neat, square and should be erected true and flush without twists and open joints. Light drifting to draw holes together may be used. Reference should be made to codes and specifications listed in this Section under Quality Assurance which govern fabrication, details, erection and workmanship. Responsibility for errors in fabrication and for proper fitting of various members shall be assumed by the structural steel fabricator.

F. Column bases shall be set on steel shims. Grouting of column bases is specified in Section 03300.

G. Steel exposed to view shall be free of surface imperfections and ground off to true surfaces. Exposed welds shall be ground smooth.

3.02 INSPECTIONS AND TESTS

A. Testing laboratory will make inspections and perform tests in accordance with the following:
   1. Obtain and furnish mill reports for steel.
   2. Verify that certification of welders is current (not older than 1 (one) year prior to time welding work is to be performed).
   3. Visually inspect welds. In addition to visual inspections, where so shown on the Drawings, perform radiographic magnetic particle and ultrasonic inspections. Conform to the latest edition of American Welding Society Specifications.
   4. Test shop bolted connections by loosening and retightening 2 bolts per high strength bolted connection. Tension after nuts are retorqued shall be at least equal to that shown, or as required by ASTM A325N.
   5. Test field bolted connections by checking at least 2 bolts of every second high strength bolted connection with a calibrated torque wrench for tension at least 5 percent higher than that shown, or as required by ASTM A325N, by the method as outlined in the "Specifications for Assembly of Structural Joints Using High Strength Steel Bolts".

3.03 ADJUSTING AND CLEANING

A. After erection, bolts, field welds, and scratched and abraded areas shall be properly cleaned and touched-up with the same paint used for the shop coat.

END OF SECTION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Items fabricated from iron and steel shapes, and plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems in other Sections of these Specifications.

B. Fasteners.

C. Protective primers and coatings.

D. Grout for installation of materials and products specified herein.

E. Prefabricated metal products specified herein.

1.02 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Shop Drawings: Layout and detail of each miscellaneous metal item shown and specified.
   2. Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete and masonry construction. Coordinate delivery of such items to Project site.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver iron and steel fabrications to the Project site and store to avoid damage and distortion of materials. Material damaged due to mishandling shall be replaced at no additional cost to the Owner.

B. Identify pieces with suitable mark for easy location.

C. Deliver products in their original wrappings or cartons clearly marked for identification and bearing manufacturers name, and model or part number if applicable. Store protected from damage and the elements. Damaged and otherwise unsuitable materials when so determined, shall be immediately removed from the Project site.

PART 2 – PRODUCTS

2.01 METAL MATERIALS

A. Structural Steel Shapes and Plates: ASTM A36.

B. Steel Plates to be Bent or Formed Cold: ASTM A203.

C. Hot-rolled, Rail Carbon Steel Bars and Shapes: ASTM A499.

D. Cold-finished Steel Bars: ASTM A108.

E. Steel Pipe: Welded or seamless, ASTM A53, black and hot dipped galvanized.

F. Steel Tubing: Cold-formed ASTM A500, or hot-rolled ASTM A501-89.

G. Galvanized Steel Sheets: ASTM A526.

H. Aluminum: Sheet, Alloy 6063 T5, thickness as indicated on detail.

I. Stainless Steel: Type 304, QQ-S-763, ASTM A276,

J. Checkered Plate: FS QQ-F-461C (1), Class 1.

K. Bolts and Nuts: ASTM A307, Grade A, galvanized.

L. Welding Electrodes: AWS Specifications.

M. Ferrous Metal Primer: SSPC 13-64; FS TT-P-86, Types II; FS TT-P-615 Type II; as appropriate for the environmental conditions and compatible with finish painting systems specified.

N. Galvanized Primer: FS TT-P-641d.

O. Bituminous Paint: Asphalt emulsion ASTM D1187.

P. Hydraulic Cement: "Porok" (Hallemite Company) "Rocktite" (Hartline Products Co. Inc.); "Five Star Instant Grout" (U.S. Grout Corporation); or "Dam-It" (Euclid Chemical Co.).

2.02 METAL FABRICATIONS

A. General:
1. Fabricate and assemble loose items in the shop and, if necessary, mark to ensure proper installation at the Project site. Disassemble for shipment only to the

extent required by shipping limitations.

2. Ease exposed edges of steel shapes.

3. Join parts with hairline contact, flush and smooth with adjacent surfaces, using concealed welds and fasteners where possible. Where exposed fastenings are unavoidable, countersink screws and bolts. Grind exposed weld areas smooth to match and blend with finished surfaces.
4. Use hot-rolled steel bars, except where cold-rolled or cold finished are shown or specified.
5. Weld in accordance with the recommendations of the AWS.

B. Ladders
   1. Unless otherwise shown, fabricate vertical steel ladders with 3/8" x 2" steel rails spaced 24" apart, and with 3/4" round steel rungs extending through the center of the rails, with connections plug-welded and ground flush. Space rungs 12" o.c. Provide angle brackets 4" x 8" x 3/8" x 3" long to hold ladder 7" away from walls.
      a. Extend the rails at the top of ladders where shown, elsewhere as required.
      b. Coat the top surface of each rung with a safety, abrasive using epoxy adhesive.

C. Miscellaneous Framing and Support:
   1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework as required to complete work.
   2. Fabricate miscellaneous units to sizes, shapes and profiles shown or if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
   3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise shown, space anchors 24" o .c. and provide minimum anchor units of 1-1/4" x 1/4"x 8" steel straps.

D. Loose Bearing and Leveling Plates: Provide loose bearing and leveling plates for steel items bearing on masonry and concrete construction, made flat, free form warps and twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

E. Miscellaneous Steel Trim: Provide shapes and sizes for profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

F. Loose Lintels: Provide loose structural steel lintels for openings in masonry walls unless otherwise detailed, including openings for mechanical and electrical work. Loose angle lintels and lintel beams shall be detailed for a minimum bearing of 1" per foot of span, but not less than 8", unless otherwise indicated.

G. Rough Hardware: Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel iron shapes as required for framing and supporting wood work, and for anchoring or securing woodwork to concrete and other structures. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.03 PRIMING AND PROTECTIVE COATING

A. Clean ferrous metal in accordance with applicable requirements of SSPC-SP1 (Solvent Cleaning) followed by cleaning with applicable requirements of SSPC-SP2 (Hand Tool Cleaning).

B. Apply specified primer to ferrous metal surfaces by brush or spray to dry film thickness of 2 mils.

C. Galvanize products as shown or specified in accordance with ASTM A123, A385 and A1223 as applicable.

D. Paint galvanized surfaces with 1 (one) coat of specified primer, by brush or spray application.

E. Paint miscellaneous metal work which is to be in contact with but not fully embedded in concrete and masonry with a heavy coat of bituminous paint. Also coat dissimilar metals which are or will be in contact with one another with such paint. Coating shall not extend onto surfaces which will be exposed.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which metal fabrications are to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting wherever taking field measurements before fabrication might delay work.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Furnish setting drawings, diagrams, templates, instruction and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete and masonry construction. Coordinate delivery of such items to Project site.

3.03 INSTALLATION

A. General:
    1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, throughbolts, lag bolts, wood screws and other connectors as required.
    2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry and similar construction.

3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitation. Grind exposed joints smooth and touch-up shop paint coat and screwed field connections.
4. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

3.04 ADJUSTING AND CLEANING

A. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint and galvanize, and touch-up exposed areas with same material as used for shop coatings. Apply by brush or spray as specified for shop coatings.

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Exterior and interior wall wood stud framing system.

B. Temporary rough carpentry including scaffolding, runways, rubbish chutes, enclosures, guardrails, barricades and ladders.

C. Blocking, roof curbs, nailing strips, grounds, anchors, furring and framing.

D. Rough hardware.

E. Plywood sheathing.

1.02 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Certifications:
      a. Preservation Treated Wood: Submit certification for water-borne preservative that moisture content was reduced to 19 percent maximum, after treatment.
      b. Fire-Retardant Treatment: When treatment is required by Codes, submit certification by treating plant that fire-retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.
      c. In lieu of written certifications specified above, each uncut piece of lumber and plywood provided shall be stamped with the appropriate designation for each treatment required.

1.03 QUALITY ASSURANCE

A. Grading Rules
   1. Lumber grading rules and wood species shall conform with Voluntary Product Standard PS 20-83. Grading rules of the following associations shall also apply to materials produced under their supervision:
      a. Northeastern Lumber Manufacturer's Association, Inc. (NELMA)
      b. Southern Pine Inspection Bureau (SPIB)
      c. West Coast Lumber Inspection Bureau (WCLIB)
      d. Western Wood Products Association (WWPA)
      e. Redwood Inspection Service (RIS)
   2. Plywood shall conform to the following:
      a. Softwood Plywood - Construction and Industrial: Product Standard PS 1-83.

B. Requirements of Regulatory Agencies:

1. Fire Hazard Classification: Underwriters' Laboratories, Inc., for treated lumber and plywood.
2. Preservative Treated Lumber and Plywood: American Wood Preservers Association, Quality Mark.
3. Pressure Treated Material: American Wood Preservers Association Standards.
4. Span Tables: National Forest Products Association.
5. Working Stresses: National Forest Products Association, National Design Specification for Wood Construction and Design Values for Wood Construction.

1.05 DELIVERY, STORAGE AND HANDLING

A. Immediately upon delivery to Project site, place materials in area protected from weather.

B. Store materials a minimum of 6" above ground on framework or blocking and cover with protective waterproof covering, providing adequate air circulation and ventilation.

C. Seasoned materials shall not be stored in wet or damp areas.

D. Protect fire-retardant materials against high humidity and moisture during storage and erection.

E. Protect sheet materials from corners breaking and damaging surfaces, while unloading.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber:
1. Dimensions:
a. Specified lumber dimensions are nominal
b. Actual dimensions conform to industry standards established by the American Lumber Standards committee and the rules writing agencies.
2. Moisture content: 19 percent maximum at time of permanent closing-in of building or structure, for lumber 2" or less nominal thickness.
3. Surfacing: Surface four sides (S4S), unless otherwise shown or specified.

B. Plywood:
1. Exterior graded plywood where used as a backing material in exterior construction: CDX.

2. Interior graded plywood where appearance is not a factor or where concealed as a backing material, except in moisture areas: C-D INT-APA.
3. In interior areas where moisture is present (Kitchen and

Food Preparation Area): CDX.

C. Fire-Retardant Treated Wood:
   1. Lumber: AWPA C20.
   2. Plywood: AWPA C27.

D. Preservative Treated Wood:
   1. Waterborne Salt Preservatives for Painted, Stained, and Exposed Natural Wood Products:
      a. AWPB LP-2, above ground application.
      b. AWPB LP-22, ground contact application.

E. Rough Hardware: Zinc coated steel unless otherwise shown or specified:
   1. Bolts: FS FF-B-575C.
   2. Nuts: FS FF-N-836C.
   3. Expansion Shields: FS FF-B-561C.
   4. Lag Screws and Bolts: FS FF-B-561C.
   5. Toggle Bolts: FS FF-B-588C.
   6. Wood Screws: FS FF-S-111C.
   7. Nails and Staples: FS FF-N-105B(3).

F. Building Paper (Felts): 15 lb. Type I and 30 LB. Type II, asphalt-saturated, non-perforated felt, ASTM D226.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which rough carpentry work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Frame wood members to a close fit, set accurately to required lines and levels and secure rigidly in place in accordance with the Drawings. Cut and fit framing, blocking, and similar items to accommodate other work.

B. Pressure-Treated Wood Products:
   1. Provide pressure-treated wood for all framing, blocking, furring, nailing strips built into exterior masonry walls, wood in contact with concrete and in conjunction with gravel stops and roofing.
   2. Provide fire-retardant treated wood for concealed blocking and for exposed wood in habitable space.

C. Anchors and Rough Hardware:
   1. Provide rough and miscellaneous hardware work shown on the

Drawings, specified herein, and otherwise required to complete the work. Install in a neat and workmanlike manner, true and firm in every respect.

2. Fastenings for wood bucks, blocking, and similar items, to masonry and concrete, shall be metal of types and spacing best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs or similar fastenings shall be used. Wood plugs and nailing blocks are not acceptable. Wire ties shall not be used.
3. Nails, spikes, bolts, anchors, screws, joist anchors, toggle bolts, expansion bolts, strap anchors, government anchors, and similar fastenings. shall be required for adequate construction of the particular parts of the work. Such items shall be aluminum, brass or galvanized, or otherwise rustproofed for exterior work.

D. Grounds, Blocking, Nailers, and Furring: Construct grounds, blocking, nailers, furring, and other similar items where shown on the Drawings and where otherwise necessary for the attachment of work of other trades.

E. Roof Related Wood Blocking:
1. Coordinate roof blocking with roofing contractor for setting heights for flashings and insulations, and other requirements.
2. Install roof related wood blocking in accordance with roofing manufacturer□s instructions, to meet FM I-90 requirement, but not less than specified in this Section.
3. Anchor blocking to decking and framing as detailed with 1/2" bolts set a maximum of 4' -0" o.c.
4. Where blocking is more than 6" wide, anchor with 1/2" bolts set at 2'-6" o.c. maximum and stagger alignments.
5. Where blocking is required on roof deck, build-up, shim, or cut as required to set top of blocking flush with the top of the adjacent insulation.
6. Cover wood blocking with temporary waterproof covering until permanent flashing is installed.

F. Plywood Sheathing for Walls:
1. Install with face grain perpendicular to direction of framing.
2. Allow minimum space 1/16" between end joints and 1/8" at edge joints for expansion and contraction of panels; double these spaces under wet or humid conditions.
3. Fasten 6" o.c. along panel edges and 12" o.c. at intermediate supports with non-corrosive screws.

G. Plywood Sheathing for Preformed Roofing Underlayment: Install sheathing with long edges of board parallel with framing, and edges and ends butted tightly. Stagger end joints 12" minimum in adjacent boards. Secure to framing at 8" o.c. with corrosion resistant No. 6 phillips bugle head self-drilling

screws.

END OF SECTION

SECTION 07210
BUILDING
INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Perimeter insulation.

B. Rigid polystyrene insulation, except roof insulation.

C. Blanket fiberglass insulation.

D. Non-reflective faced blanket insulation.

E. Reflective faced blanket insulation.

F. Vapor retarder.

G. Safing insulation.

H. Adhesives and other means of securing insulation in place.

1.02 RELATED SECTIONS

A. Section 07530 - Elastic Sheet Roofing: For roof insulation included in this system.
B. Section 13125 – Pre-engineered Metal Building System
C. Section 09100 – Acoustical Ceiling

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Test Reports: Independent testing laboratories reports stating compliance with ASTM Specifications for each type rigid polystyrene insulation.
      a. Test reports shall be dated within 6 months of the product manufacture date.

1.04 DELIVERY, STORAGE AND HANDLING

A. Do not deliver insulation to the Project site prior to the time of its installation. Handle and store material to prevent damage. Store under cover and above ground. Damaged and otherwise unsuitable material, when so determined, shall be immediately removed from the Project site.

B. Do not allow insulation to become wet, soiled, and covered with ice and snow. Protect rigid insulation from exposure to high ambient temperatures, excessive exposure to sunlight, and contact with hot surfaces and materials (in excess of the safe temperature below the melting point

indicated by the manufacturer).

PART 2 - PRODUCTS

2.01 MATERIALS

A. Perimeter Rigid Insulation Below Grade: Extruded polystyrene board, 1.6 lbs. pcf density (minimum), complying with ASTM C578, Type IV, thickness as shown on the Drawings.

B. Rigid Insulation Between Concrete Slabs: Extruded polystyrene board, 2.2 lbs. pcf density (minimum), 60 psi compressive strength (minimum), complying with ASTM C578, Type VII, thickness as shown on the Drawings.

C. Rigid Insulation in Cavity Walls: Expanded polystyrene board, 0.9 lbs. pcf density (minimum), complying with ASTM C578, Type I, thickness as shown on the Drawings.

D. Rigid Insulation System: Expanded polystyrene board, 0.9 pcf density (minimum), complying with ASTM C578, Type I with prelaminated furring stud 16" o.c. and shiplap vertical edges, thickness as shown on the Drawings.

E Blanket/Batt Insulation: Unfaced fiberglass blankets/batts complying with ASTM C665, Type I, thickness as shown on the Drawings.

F. Non-Reflective Faced Blanket Insulation: Kraft faced fiberglass blankets complying with ASTM C665, Type II.

G. Reflective Faced Blanket Insulation: Foil faced fiberglass blankets complying with ASTM C665, Type III.

H. Vapor Retarder:
   1. 6 mil polyethylene film, clear or natural color; for use when concealed by gypsum wallboard and other rigid substrates.

I. Safing Insulation: Semi-rigid mineral fiber blanket, 4.0 lbs. pcf density complying with ASTM C612-83, Class 1 and 2.

J Adhesives where required as recommended by the manufacturer of the insulation.

K. Other materials, such as fasteners and retainers, not specifically described, but required for a complete and proper installation of building insulation, shall be as selected by the Subcontractor or material supplier subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the supporting structure, the substrate, and the conditions under which the insulation work is to be performed, and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Review safety precautions, proposed operating procedures and environmental requirements with the Contractor and with the manufacturer's or supplier's representative before proceeding with the installation.

3.03 INSTALLATION

A. General: Comply with manufacturer's instructions for the particular conditions of installation in each case.

B. Extend insulation full thickness over entire area to be covered unless otherwise shown.

C. Install perimeter insulation on vertical surfaces using spot adhesive as necessary to temporarily hold insulation in place, butting panels tightly together.

D. Install blanket insulation in walls and soffits, friction-fit. Install vapor barrier over insulation.
    1. Seal vertical joints in vapor barriers over framing by lapping not less than 2 studs. Fasten vapor barriers to framing at top, end and bottom edges, at perimeter of wall openings and at lap joints.
    2. Seal joints caused by pipes, conduits, electrical boxes and similar items penetrating vapor barriers with cloth or aluminized tape of type recommended by vapor barrier manufacturer to create an air-tight seal between penetrating objects and vapor barrier.
    3. Repair tears and punctures in vapor barriers immediately
    before concealment by other work. Cover with tape or

another layer of vapor barrier material taped in place.

E. Fill cracks and voids around frames and blocking, other voids in exterior walls and voids around wood curbs and blocking in and about the roof with loose insulation. Wedge in place, completely filling voids.

F. Fill voids created by flutes in metal deck with safing insulation, where ceiling track runs perpendicular to flutes in fire rated wall construction and elsewhere as shown.

END OF SECTION

SECTION 07650
FLEXIBLE FLASHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Concealed waterproof membrane sheeting.

B. Mastic for setting and sealing joints.

C. Accessories.

1.2 RELATED SECTIONS

A. Section 07620 - Sheet metal flashing and trim.

B. Section 06100 - Rough Carpentry: Flashings at openings and sills.

1.3 REFERENCES

American Society for Testing and Materials:
1. ASTM D412-61T - Test for Tensile Strength.
2. ASTM D1004-61T - Test for Tear Resistance.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's data sheets showing product characteristics and including installation instructions.

C. Samples: Actual pieces of flashings specified, not less than 6 inches square.

1.5 QUALITY ASSURANCE

A. Comply with installation recommendations of Flexible Flashing manufacturer.

B. Installer Qualifications: Company with at least five years of successful experience in weathertight installation of flashing.

C. Coordination: Interface flashing work with adjacent and adjoining work to ensure best possible weather resistance and durability of completed flashing.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in manufacturer's sealed packaging, bearing manufacturer's name and product identification.

B. Stack flashing materials to avoid twisting, bending, and abrasion. Protect materials from weather before installation.

C. Store mastic materials in sealed containers under cover.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Provide Concealed Membrane Waterproofing: ▷**NERVASTRAL HD**◁ as manufactured by Nervastral, Inc. Phone: (203) 622-6030.
B. Requests for substitutions will be considered in accordance with provisions of Section 01600.
C. Substitutions:
   1. Firestone Building Products: ▷Firestone Flashgard◁

2.2 MATERIALS

A. Flexible Flashing: Membrane waterproofing sheets composed of a non-reinforced, homogeneous, waterproof, impermeable compound of elastomeric substance formed into a continuous sheet.
   1. Membrane thickness: .020"
   2. Membrane width 48"
   3. Membrane color: Black.

2.3 ACCESSORIES

A. Adhesive: For material.040 inches and less, use adhesive as provided by Nevastral, Inc.

B. Reglets: Types and profiles as recommended by flashing manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

A. Verify that surfaces to receive flashing are smooth, even and free from dirt, debris, tar, oil or grease. Surfaces shall be thoroughly dry and all holes, crack, or cavities filled and smoothly finished.

3.2 INSTALLATION

A. General: Comply with all manufacturer recommendations for installation.
   1. Lap joints minimum of 4 inches and seal watertight with mastic.
   2. Carry flashing vertically as detailed, but not less than 6 inches above horizontal plane.
   3. Extend flashing under parapet wall coping to seal off top of EIFS, preventing water from entering wall cavity.

END OF SECTION

SECTION 07900
SEALANTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Sealants and caulks.

B. Cleaners, primers and sealers.

C. Joint filler and bond breaker.

1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Sealants for roof related sheet metal work.

B. Sealants for sealing perimeter of aluminum frames including aluminum entrances and storefronts, and aluminum windows. This sealant work is performed by the installer of each of these components to provide single source responsibility and consistency in sealants used.

1.03 RELATED SECTIONS

A. Section 09250 - Gypsum Wallboard: For acoustical sealants.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Samples: Samples of each compound and filler for color selection.

1.05 QUALITY ASSURANCE

A. The work of this Section shall be done by a sealant installer with a minimum of 3 years experience in the type of work shown and specified.

B. Select only sealing compounds of manufacturers who agree to have a qualified representative visit the site at the beginning of the joint sealing work and periodically thereafter as necessary to ensure the proper installation of the sealing compounds.

1.06 DELIVERY, STORAGE AND HANDLING

A. Handle and store sealant and caulking material at the job site to prevent damage. Packaged material shall be in original containers with seals unbroken and labels intact until time of use. Wrapped or bundled material shall bear the name of the manufacturer and the product. Immediately remove damaged and otherwise unsuitable material, when so determined, from the Project site.

1.07 PROJECT CONDITIONS

A. Do not install sealants during rain, snow, and when temperatures are below, and above manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.

B. Wherever joint width is affected by ambient temperature variations, install
sealants only when temperatures are in the lower third of manufacturer's recommended installation temperature range, so that sealant will not be subject to excessive elongation and bond stress at extremely low temperatures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Sealants:
1. Sealant S1: Multiple component, epoxidized polyurethane terpolymer,
FS TT-S-00227E, Type II, Class A (25 percent movement):
   a. "Dynatrol II" (Pecora Corp.)
   b. "Sikaflex - 2c MS" (Sika Corp.)
   c. "Sonolastic NP 2" (Sonneborn Building Products Division,
   ChemRex, Inc.)
   d. "Dymeric" (Tremco, Inc.)
2. Sealant S2: One part, silicone, non-sag, FS TT-S-00230C, Type II, Class A (25 percent movement):
   a. "999-A Silicone Building & Glazing Sealant" (Dow Corning Corp.)
   b. "Construction 1200" (General Electric);
   c. "863" (Pecora Corp.)
3. Sealant S3: One part, silicone, mold and mildew resistant, FS TT-S-001543A:
   a. "786 Mildew Resistant Silicone Sealant" (Dow Corning Corp.)
   b. "Sanitary 1700" (General Electric)
   c. "863" (Pecora Corp.)
4. Sealant S4: Multiple component, self-leveling polyurethane,
FS TT-S-00227E, Type 1, Class A:
   a. "Urexpan NR-200" (Pecora Corp.)
   b. "Sonolastic Paving Joint Sealant" (Sonneborn Building Products Division, ChemRex, Inc.)
   c. "THC-900" (Tremco, Inc.)
5. Sealant S5: One part, butyl FS TT-S-001657, Type I (5 percent movement):
   a. "BC-158" (Pecora Corp.)

b. "Butyl Sealant" (Tremco, Inc.)

6. Calking Compound C1: One part non-sag acrylic latex (7-1/2 percent movement):
   a. "AC-20 (Pecora Corp.)
   b. "Sonolac (Sonneborn Building Products Division, ChemRex, Inc.)
   c. "Tremco Acrylic Latex 834" (Tremco, Inc.).
7. Sealant colors shall be selected by the Architect from manufacturer's standard selections.

B. Joint Filler: Closed-cell expanded polyethylene rod, "Sonofoam Backer-Rod" (Sonneborn Building Products Division, of ChemRex, Inc.); or approved substitution.

C. Joint Cleaner Primer and Sealer: Type recommended by the manufacturer of the sealing and calking compound for the specific joint surface and conditions.

D. Bond Breaker: Polyethylene tape.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which sealant work is to be performed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean surfaces and remove protective coatings which might fail in adhesion and interfere with bond of compound so that surfaces are free of deleterious substances which might impair the work. Except as otherwise approved by the manufacturer, elastomeric sealants shall not be applied to joint surfaces previously treated with paint, lacquer, sealer, curing compound, water repellent and other coatings unless such coatings have been entirely removed.

B. Prime surfaces in accordance with the instructions of the sealant manufacturer.

C. Install bond breakers in locations and of type recommended by the sealant manufacturer to prevent bond of sealant to surfaces where such bond might impair the performance of the sealant.

3.03 INSTALLATION

A. Install materials in accordance with the manufacturer's printed instructions.
   1. Compounds shall not be installed below a temperature of 40 degrees F. unless the manufacturer specifically permits installation at a lower temperature. If job conditions require the installation of compounds below 40 degrees F. (or below the minimum installation temperature recommended by the manufacturer), consult the manufacturer's representative and establish the minimum provisions required to ensure the satisfactory work.
   2. Install rod stock in joints to receive sealant. Use proper size and shape pieces so that installed rod stock is compressed 25 percent to 30 percent and face of rod stock is at the required depth. Do not twist or braid rod stock. Carefully roll rod stock into the joint without stretching.
   3. Confine compounds to joint areas shown. Use masking tape to prevent staining of adjoining surfaces, and spillage and migration of compound out of the joints. Tool surface to shape shown or, if none is shown, to flush or slightly concave surface. Remove excess compound and clean adjoining surfaces as may be required to eliminate indication of soiling and migration.
   4. Use power driven equipment wherever possible to install compounds to ensure uniformity of application and the highest quality of workmanship.
   5. Use polyurethane sealants (Sealant S1) at the perimeter of window frames, door frames, miscellaneous frames, and for wall construction, control and expansion joints.
   6. Use silicone sealant (Sealant S2) for sheet metal work.
   7. Use silicone sealant (Sealant S3), mold and mildew resistant type for use around plumbing fixtures only.
   8. Use self-leveling polyurethane sealant (Sealant S4) for expansion joints in pedestrian traffic bearing surfaces.
   9. Use butyl rubber sealant (Sealant S5) for bedding thresholds and sill plates.
   10. Use acrylic latex caulking compound for interior applications
       only, except as follows:
       a. Do NOT use this material:
          1) Where joint movement is expected in excess of the materials specified capabilities.
          2) Where a sealant is otherwise shown or specified above for use.

3.04 PROTECTION

A. Protect joint sealant during and after curing period from contact with contaminating substances and from damage resulting from construction operations and other causes so that they are

without deterioration and damage at time of Substantial Completion. Cut out and remove damaged and deteriorated joint sealants immediately and reseal joints with new materials to produce joint sealant installation with repaired areas indistinguishable from original work.

3.05 CLEANING

A. Clean off excess sealants and sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

END OF SECTION

SECTION 08114
HOLLOW STEEL DOORS
AND FRAMES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Flush, hollow standard steel doors.

B. Welded standard steel door frames and frames for sidelights and other interior glazed openings.

1.02 RELATED SECTIONS

A. Section 04200 - Unit Masonry: For building in of anchors and grouting of frames in masonry construction.

B. Section 08210 - Wood Doors.

C. Section 08710 - Finish Hardware.

D. Section 08800 - Glazing.

E. Section 09900 - Painting.

1.03 REFERENCES

A. Comply with the current provisions of the following codes, specifications, and standards, except where more stringent requirements are shown on the Drawings and specified herein.
   1. American National Standards Institute (ANSI):
      a. ANSI A115 Series 82 on door and frame preparation.
   2. American National Standards Institute/Steel Door Institute
      a. ANSI/SDI 100, Recommended Specifications for Standard Steel Doors and Frames.
      b. ANSI/SDI A151.1, Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors and Hardware Reinforcings.
      c. SDI 112, Galvanized Standard Steel Doors and Frames.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver, handle and store doors and frames at the Project site to prevent damage. Doors shall not be received before the building is enclosed. Wrappings or coverings shall be removed upon arrival of doors at the Project site. The doors shall be stored in a vertical position on blocking, clear of the floor and with blocking between the doors to permit air circulation between the doors. Damaged and otherwise unsuitable doors and frames, when so determined, shall be immediately removed from the Project site.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Products manufactured by the following companies complying with these specifications will be acceptable:
   1. Ceco Corp.
   2. Steelcraft Mfg. Co.

2.02 MATERIALS

A. Structural Steel Shapes: ASTM A36.

B. Steel Bars: ASTM A108.

C. Steel Plate: ASTM A283.

D. Sheet Steel: ASTM A366, commercial quality, cold rolled, stretcher leveled.

E. Galvanized Steel Sheets: Zinc-coated carbon steel sheets of commercial quality, complying with ASTM A526, and with ASTM A525, G60 zinc coating, mill phosphatized.

F. Supports and Anchors: Fabricate of not less than 18 gage galvanized sheet steel.

G. Inserts, Bolts, and Fasteners: Manufacturer's standard units, except hot-dip galvanized items to be built into exterior walls, complying with
ASTM A153, Class C or D as applicable.

H. Primer: Rust inhibitive type, gray, red or beige as standard with the manufacturer.

2.03 FABRICATION

A. General:
   1. Fabricate hollow metal doors and frames, and frames for wood doors as shown on the Drawings and in accordance with best shop practices. Frames shall be rigid, neat in appearance, and free from defects. Field measurements shall be taken as required for coordination with adjoining work.
   2. Form exposed surfaces free from warp, wave and buckle, with corners square, unless otherwise shown. Set each member in proper alignment and relationship to other members with surfaces straight and in a true plane.
   3. Reinforce members and joints with steel plates, bars, rods or angles for rigidity and strength.
   4. Conceal fastenings unless otherwise shown or specified.
   5. Doors and frames shall be mortised and reinforced for

hardware in accordance with the hardware manufacturer's instructions and templates. The reinforcing shall be drilled and tapped to receive hinges, locks, strikes, closers, and other hardware requiring reinforcing.

6. Grades:
   a. Grade II - Heavy Duty, Model 1: Full flush design for interior doors - typical.
   b. Grade III - Extra Heavy Duty, Model 2: Seamless design for exterior doors - typical.

B. Frames:
   1. Provide combination type hollow metal door frames to be used as both door buck and trim, formed to profiles.
   2. Unless otherwise shown, fabricate interior frames of 16 gage steel and exterior frames of 14 gage galvanized steel.
   3. Frames shall be fully welded with corners mitered and ground smooth.
   4. Frames for doors of high frequency use (Locker rooms, vestibules, stairways, public toilet rooms, and similar areas) shall be reinforced with two 10 gauge steel straps immediately above and below the top hinge in addition to standard reinforcement, conforming to the frame profile and welded to the frame.
   5. Make provisions for installing rubber door silencers on interior door frames. Three for single frames and 4 for pairs of hinged doors.
   6. Frame Reinforcing:
      a. Cover boxes shall be provided for hardware cutouts.
      b. Hinge reinforcements shall be 9 gauge, 1-1/2" x 9" long and welded to frame.
      c. Lock strike reinforcement shall be 16 gauge, 1-1/2" x 6" long.
      d. Closer and holder reinforcements shall be 12 gauge, 1-3/4" x 20" long welded to frame.
      e. Angle floor clips shall be 16 gauge welded to frames or shipped loose, and each drilled for two 3/8" anchors.
   7. Furnish at least 3 metal anchors in each jamb of frames up to 84" high and 1 (one) additional anchor for each 24" in height above 84", in shapes, sizes and spacing shown or required for anchorage into adjoining wall construction. Fabricate joint anchor of steel no lighter than gage used for the frame, unless otherwise shown.
   8. Except where frames are set in masonry, and in steel stud walls where studs extend to supporting construction above, equip frames with vertical steel struts, 3/8" x 2" minimum size, extending from top of frame at each jamb to supporting construction above. Bend top of struts at right angle for attachment to supporting construction above by bolting, welding or other suitable anchorage. Provide bolted attachment of struts to frame jambs to

permit height adjustment during installation.

9. Terminate bottom of frames at the indicated finished floor level.
10. Furnish removable steel spreaders attached at the bottom of 3-sided frames.
11. Provide 18 gauge channel glazing stops for borrowed lites and sidelites. One stop shall be fixed and 1 (one) stop shall be removable to facilitate glazing and re-glazing.
12. Mark frame number on the jamb of each frame in butt recess for identification at the job site.

C. Doors:

1. Flush hollow metal doors shall be fabricated with face sheets each formed of 18 gage steel for interior doors and 16 gage galvanized steel for exterior doors. Doors shall be 1-3/4" thick unless otherwise noted. Doors with small glazed and louvered openings shall be constructed similarly. Reinforce the face sheets with 20 gage interlocking vertical C-shaped or Z-shaped reinforcing members spaced not over 6" apart and spot welded to both face sheets, or reinforce with a continuous truss formed under core of sheet metal, not lighter than 28 gage, spot welded to both face sheets, or 2-3/4" horizontally and vertically over entire surface of both faces, or with impregnated kraft honeycomb core completely filling the inside of the door and laminated to both inside faces of the panels. Provide continuous reinforcing members welded to face sheets at the top and bottom of door. For vertically reinforced doors, place cork, fiberboard, or mineral wool board, in the spaces between reinforcing members. Provide removable stops of 18 gage steel for glazed openings; fasten with oval head, counter-sunk screws at not more than 12" o.c.
2. Top and bottom edges of doors shall be closed with a continuous flush channel not less than 16 gage, extending full width of door and spot welded to both faces. Exterior doors shall have flush channel top or top cap as standard with the manufacturer. Both vertical edges of doors shall be flush and beveled 1/8" in 2".
3. Provide clearances for hollow metal doors of 3/32" at jambs and heads, 1/8" at meeting stiles for pairs of doors and 3/8" at bottom where no threshold is required. Where a threshold is shown, provide 1/8" clearance above threshold.
4. Exterior non-fire rated hollow metal doors shall be insulated with polystyrene or polyurethane at door manufacturer's option.

D. Fire Rated Doors and Frames:
   1. In addition to other requirements for hollow metal doors and frames specified herein, comply with the label requirements of the Underwriters Laboratories, the National Fire Protection Association and applicable local codes. Fabricate doors and frames in accordance with the requirements of NFPA Standard No. 80 and UL Standard for Safety No. 63 for the class of door opening scheduled.
      a. Doors and frames shall bear the appropriate Underwriters Laboratories labels.
      b. Label shall state required fire-protection rating and maximum temperature rise rating.
         1) Maximum temperature rise rating is required for doors protecting exit enclosures.
      c. Where pairs of doors are scheduled, provide door manufacturer's standard astragal identical in performance to the astragal used in the approved test assembly for the fire rating indicated or required.

2.04 SHOP PAINTING

A. Thoroughly clean metal surfaces of loose scale, shavings, filings, dirt and other deleterious materials by use of wire brushes or other effective means. Remove grease and oil by solvent cleaning.

B. Chemically pretreat surfaces with a phosphate compound to maximize paint adherence. Apply 1 (one) coat of specified primer. Cover surfaces without runs, smears and bare spots.

C. Paint inside surface of removable stops and the frame area covered by such stops.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the substrate and conditions under which hollow metal work is to be installed and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. General: Install standard steel doors, frames, and accessories in accordance with final Shop Drawings and manufacturer's data, and as specified herein.

B. Frame Installation:
   1. Except for frames located at in-place concrete and masonry and at drywall installations, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
      a. In masonry construction, locate 3 wall anchors per jamb at hinge and strike levels. Frames shall be grouted full of mortar at jambs and anchors shall be built into the joints as walls are laid up.
      b. At in-place concrete and masonry construction, set frames and secure to adjacent construction with machine screws and masonry anchorage devices.
      c. Install fire-rated frames in accordance with NFPA Standard No. 80.
      d. In stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In wood stud partitions attach wall anchors to studs with tapping screws.

C. Door Installation:
   1. Fit hollow metal doors accurately in frames, within clearances specified in ANSI/SDI-100-85 and Paragraph 2.03.C of this Section.
   2. Place fire-rated doors with clearances as specified in NFPA Standard No. 80.

3.03 ADJUSTING AND CLEANING

A. Remove dirt and excess sealants from exposed surfaces.

B. Touch up welds, scratches and abraded spots with same paint as used for the prime coat.

C. Adjust moving parts for smooth operation.

D. Remove debris from Project site.

END OF SECTION

SECTION 08210
WOOD DOORS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Flush wood doors.

B. Pre-machining of fire-rated wood doors.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry: For installation of wood doors.

B. Section 08114 - Hollow Steel Doors and Frames: For frames for wood doors.

C. Section 08710 - Finish Hardware.

D. Section 08800 - Glazing.

E. Section 09900 - Painting.

1.03 QUALITY ASSURANCE

A. Except as otherwise specified herein, wood doors shall conform with publications Architectural Woodwork Institute (AWI) Fifth current Edition , Section 1300 and National Wood Window and Door Manufacturer's Association (NWWDA) I.S 1-86.

B. Where shown as fire doors, doors shall conform with Underwriters Laboratories, standard, UL 10(b) for label indicated on Drawings or specified herein, face veneer shall conform with Section 3.11. Fabrication of doors shall permit installation in accordance with National Fire Protection Association (NFPA) Pamphlet No. 80.

1.05 DELIVERY, STORAGE AND HANDLING

A. Doors shall be stacked flat on pallets, separated from each other by non-absorbent spacers, and protective wrapped by the manufacturer and shall not be delivered to the Project site until building has been closed-in and is thoroughly dry. Doors shall be stored flat. Doors shall not be removed from manufacturer's protective packaging until painting and other interior finishing work has been completed. Remove damaged and otherwise unsuitable doors, when so determined, immediately from the Project site.

1.06 WARRANTY

A. The Contractor shall warrant the wood doors to be free of faults and defects in accordance with the General Conditions, except that the warranty shall be extended by door manufacturer's warranty for life of original installation. The warranty shall be in writing and shall be signed by the door manufacturer. Warp in excess of that permitted by NWWDA Industry Standard, and other defects which may affect the operation of the door, shall be considered a defect under the provisions of the warranty. The door manufacturer or door manufacturer's authorized representative shall be responsible for inspecting the installation of the doors before issuance of the warranty, and shall note on the warranty that the doors have been hung in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Solid Core Doors
   1. Algoma Hardwoods, Inc.
   2. Eggers Industries
   3. Weyerhaeuser Co.

2.02 FABRICATION

A. Door Types
   1. Flush, 5-ply (7-ply doors are NOT acceptable) solid wood core, hardwood veneered Premium Grade, AWI Quality Standards, Section 1300.
      a. Cores: Particleboard core, Symbol PC-5 or glued block solid wood core.
      b. Face Veneer: Red Oak, rotary cut; for opaque paint finish or stain finish.
      c. Crossbands: Hardwood, 1/16" thick, extending full width of door.
      d. Edge Bands: Same species as face veneer, matched for color.

B. Refer to Section 08710 for hardware.
   1. Where pairs of doors are scheduled, provide door manufacturer's standard astragal identical in performance to the astragal used in the approved test assembly for the fire rating indicated or required.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Refer to Section 06200 for installation.

B. Refer to Section 09900 for sealing doors upon arrival at the Project site and for field finishing.

END OF SECTION

SECTION 08360

SECTION OVERHEAD DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Electrically operated sectional overhead doors.

1.2 RELATED SECTIONS

A. Section 09900 - Paints and Coatings: Field painting.

1.3 REFERENCES

A. ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors; 1996.

B. ASTM A 229/A 229M - Standard Specification for Steel Wire, Oil-Tempered for Mechanical Springs; 1993.

C. 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.

D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

E. ASTM E 330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference; 1996.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product Data: Manufacturer's specifications and technical literature.

C. Shop Drawings: Drawings of openings, showing locations of track anchors and other supports.

D. Operation and Maintenance Data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Authorized by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Sectional Overhead Doors: Provide products manufactured by Wayne-Dalton Corporation, One Door Drive, Mt. Hope, OH 44660. ASD. Tel: (216) 674-7015. Fax: (216)674-1857 OR EQUAL.

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

C. Substitutions: Equal quality permitted.

2.2 SECTIONAL OVERHEAD DOORS

A. Insulated Sectional Overhead Doors: Insulated steel tongue-and-groove jointed panels with roll-formed internal struts with polypropylene rib caps to provide thermal break; end caps to provide tight seal at jambs; and hardware plates at all fastener points.
   1. Complying with ANSI/DASMA 102 requirements for commercial doors.
   2. Wind Load Performance: Withstanding 15.2 psf (728 Pa) external pressure and 12 psf (575 Pa) internal pressure when tested in accordance with ASTM E 330.
   3. Insulation: Foamed-in-place high density polyurethane core with flamespread of 10 and smoke density of 210 when measured in accordance with ASTM E 84.
   4. Finish: Baked-on polyester primer and finish coat.
   5. Panel Thickness: 2 inches (50 mm).
   6. Face Sheet Thickness: 26 gauge (0.45 mm).
   7. Panel Design: Flush, embossed 1/4 in (6.3 mm) pinstriping, non-repeating random stucco texture.
   8. Thermal Resistance: Calculated "R" value of 16.16.
   9. Zinc Coating: Z275 galvannealed, before finishing.
   10. Color: White.
   11. Panel Thickness: 2 inches (50 mm).
   12. Face Sheet Thickness: 20 gage, 0.036 inch (0.9 mm).
   13. Panel Design: Flush.
   14. Thermal Resistance: Calculated "R" value of 16.16, max.
   15. View Windows: Sealed 1/2 in (12.8 mm) insulated units, 24 by 6 inches (610 by 150 mm), in high-impact polymer frames.

2.3 COMPONENTS

A. Tracks: Graduated wedge type weathertight design, with mounting brackets.
   1. Material: 16 gage, 0.06 inch (1.52 mm), galvanized steel sheet, ASTM A 653/A 653M, Z120 hot-dipped zinc-aluminum coating.
   2. Depth: 3 inches (76 mm).

B. Hardware:
   1. Hinges: Hot-dipped galvanized steel.
   2. Track Rollers: Steel, with case-hardened inner steel races and 10 ball bearings.
   3. Weatherstripping: Rubber head seal, panel joint seals, and compressible U-shaped PVC bottom seal mounted in aluminum retainer.

C. Counterbalances: Spring torsion type capable of supporting entire door weight, made of ASTM A 229/A 229M oil-tempered steel wire.

   1. Performance: Minimum of 100,000 cycles.
   2. Spring Fittings and Drums: Die-cast high strength aluminum.
   3. Cables: Preformed galvanized steel aircraft cables with minimum safety factor of 5 to 1.

D. Locks: Rim cylinder and locking bar, operable from outside and inside.

PART 3 EXECUTION

3.1 EXAMINATION

A. Before beginning work, verify that openings have been properly prepared.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install doors plumb, level, and operating smoothly without binding.

END OF SECTION

SECTION 08410
ALUMINUM ENTRANCES
AND STOREFRONTS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Glazed aluminum doors.

B. Glazed aluminum storefront.

C. Door hardware except cylinders.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Sealants are specified in Section 07900.

B. Glass and glazing materials are specified in Section 08800.

1.03 RELATED SECTIONS

A. Section 08710 - Finish Hardware: Door hardware for manually operated aluminum doors shall be provided by Section 08410 except cylinders which are provided by Section 08710. All hardware is listed in this Section 08710 for consistency in selection and evaluation of hardware requirements.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Samples:
      a. One 8" length of aluminum extrusion in the finish specified.

1.05 QUALITY ASSURANCE

A. Comply with the provisions of the following codes, specifications and standards except where more stringent requirements are shown on the Drawings and specified herein.
   1. Aluminum Association (AA).
   2. American Architectural Manufacturers Association (AAMA)
   3. National Association of Architectural Metal Manufacturers (NAAMM).

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver entrances and storefront to the Project site clearly marked for proper identification.

B. Store in accordance with manufacturer's instructions, above ground, and protected from weather, construction

activities, and other causes of damage.

C. Materials shall be handled at the Project site to prevent damage. All damaged and otherwise unsuitable material when so determined shall be immediately removed from the Project site.

1.07 WARRANTY

A. The Contractor shall warrant, in writing, that the entrances and storefront will be free of faults and defects in accordance with the General Conditions, except the warranty period shall be 3 years. Warranty shall be signed by the Contractor, Subcontractor and manufacturer.
   1. Failure of materials and workmanship includes excessive leakage and air infiltration, excessive deflections, faulty operation of entrances, deterioration of anodic finish and construction in excess of normal weathering, and defects in other components of the work.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Vistawall Architectural Products.
B. Kawneer Company, Inc.
C. U.S. Aluminum Corporation.

2.02 SYSTEMS

A. Storefront
   1. Vistawall Series 3000S,thermally broken system. 2-1/4" x 4" at all intermediate vertical and horizontal mullions, and 1-1/2" x 4" at the perimeters.
   2. Vistawall Series FG1000 1-3/4" x 4".

B. Doors:
   1. Entry Doors: Vistawall Series 375 Medium Stile with a nominal 3-3/4" side rail, 3-1/2" top rail, and an 8" one-piece bottom rail. Provide muntin bars - see Section 08800 - Glass & Glazing (make provisions for the muntin bars to be within the glass lites).

2.03 MATERIALS

A. Aluminum Materials
   1. Alloy: 6063 T5
   2. Thickness: As necessary to comply with structural and wind loading requirements, but not less than the following:
      a. Principal Extrusions: 0.125".

b. Principal Formed Sheet Members: 0.125".
c. Extruded Glazing Stops and Trim: 0.062".
d. Formed Glazing Stops and Trim: 0.050".
e. Sheet: 0.050".

B. Fasteners: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components.
1. Do not use exposed fasteners except where unavoidable for application of hardware. Match finish of adjoining metal.

2. Provide Phillips flat-head machine screws for exposed fasteners.

C. Concealed Flashing: Dead-soft stainless steel 26-gage minimum, type selected by manufacturer for compatibility.

D. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible; otherwise, nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A123-84.

E. Concrete/Masonry Inserts: Cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A123.

F. Bituminous Coatings: Cold-applied asphalt mastic complying with SSPC-PS 12, compounded for 30-mil thickness per coat.

G. Compression Weatherstripping: Manufacturer's standard replaceable stripping of either molded neoprene gaskets complying with ASTM D2000 or molded PVC gaskets complying with ASTM D2287.

H. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric and aluminum strip backing.

I. Sill Plates: Provide sill plates.

J. Refer to Section 07900 for sealant materials.

K. Hardware: Refer to Section 08710 for finish hardware schedule.

L. Refer to Section 08800 for glazing materials.

2.04 FABRICATION

A. General:
1. Coordination of Fabrication: Wherever possible, check the actual frame and door openings in the

construction work by accurate field measurement before fabrication, However, coordinate fabrication schedule with construction progress as directed by Contractor and avoid delays of the work. Where necessary, proceed with fabrication without field measurements, and coordinate installation tolerances to ensure proper fit of door and frame units.

2. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are shown on Drawings. Variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.
   a. Details shown are based upon standard details by manufacturer indicated.

3. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site. Disassemble components only as necessary for shipment and installation.

4. Sequence: Complete cutting, fitting, forming, drilling,and grinding of metal work prior to cleaning, finishing, surface treatment, and application of finishes. Remove arises from cut edges and ease edges and corners to radius of approximately 1/64".

5. Welding: Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish.

6. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator which will prevent corrosion.

7. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.

8. Fasteners: Conceal fasteners wherever possible.

9. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops; at other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge.

B. Thermal-Break Construction: Fabricate exterior aluminum storefront framing system with manufacturers standard thermal barrier, located between exterior materials and

exposed interior members, in manner which eliminates direct metal-to-metal contact.

C. Stile-and-Rail Type Aluminum Doors:
1. Frame: Provide tubular frame members, fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts, or fabricate with structurally welded joints, at manufacturer's option.

2. Glazing: Fabricate doors to facilitate replacement of glass and panels, without disassembly of door stiles and rails. Provide snap-on extruded aluminum glazing stops, with exterior stops anchored for non-removal.

D. Non-Thermal Construction: Fabricate tubular and channel frame assemblies, as shown, with either welded or mechanical joints in accordance with manufacturer's standards, reinforced as necessary to support required loads.

E. Finishes:
1. Fluoropolymer Architectural Coating; Color: As selected by Owner.

F. Performance Criteria:
1. Thermal Movement: Fabricate exterior components from manufacturer's stock systems which have been designed to provide for expansion and contraction resulting from ambient temperature range of 120 degrees F.

2. Wind Loading: Fabricate exterior components from manufacturer's stock systems which have been tested in accordance with ASTM E330 to withstand at least the following loadings:

a. Uniform pressure of 20 psf inward and 20 psf outward.

3. Weather Resistance: Fabricate exterior components from manufacturer's stock systems which have been tested to demonstrate permanent resistance to leakages as follows with test pressure differential of 10 percent of design loading (excluding operable door edges).
a. Air Infiltration: Not more than 0.007 cfm/sf of fixed area, at a test pressure of 6.24 lbs. psf; tested in accordance with ASTM E283.
b. Water Infiltration: No uncontrolled water penetration at a test pressure of 9 lbs. psf; tested in accordance with ASTM E331.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the surrounding structure and the conditions under which the work is to be erected, and notify the Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with manufacturer's instructions and recommendations for installation of aluminum framing systems.

B. Set units plumb, level, and true to line, without warp and rack of framing members doors, and panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion of electrolytic action at points of contact with other materials.

C. Set sill members and other members in a bed of compound as shown, or with joint fillers or gaskets as shown to provide weathertight construction.
   1. Refer to Section 07900 for compounds, fillers and gaskets to be installed during installation of doors and frames.

D. Comply with manufacturer's recommendations and Section 08800 for glass and glazing work.

E. Cooperate and coordinate with Electrical Subcontractor in installing low voltage wiring and reed switches in door frame heads for security requirements as required.

F. Drill and tap frames and doors and apply surface-mounted hardware items, complying with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.

3.03 ADJUSTING AND CLEANING

A. Adjust operating hardware to function properly, without binding, and to provide tight fit at contact points and weatherstripping.

B. Clean completed system, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and sealant compounds, dirt, and other

substances from aluminum surfaces.

C. Advise Contractor of protective treatment and other precautions required through the remainder of the construction period, to ensure that doors and frames will be without damage and deterioration (other than normal weathering) at the time of acceptance.

END OF SECTION

SECTION 08710
FINISH HARDWARE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Finish hardware.

B. Cylinders for aluminum entrance locks.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry:
   1. For furnishing and installation of clothes storage hardware, shelf standards and brackets, cabinet and custom casework hardware.
   2. For installation of door hardware scheduled herein.

B. Section 08410 - Aluminum Entrances and Storefront: For furnishing of door hardware specified in Section 08710 for aluminum doors except cylinders.

1.03 REFERENCES

A. Comply with the provisions of the following codes, specifications and standards except where more stringent requirements are shown on the Drawings and specified herein:
   1. American National Standards Institute (ANSI) A115.1 "Specification for Standard Steel Door and Frame Preparation for Mortise Locks for 1-3/8" and 1-3/4" Doors".
   2. American National Standards Institute (ANSI), A115.2 "Specification for Standard Steel Door and Frame Preparation for Bored or Cylindrical Locks for 1-3/8" and 1-3/4" Doors".
   3. Builder's Hardware Manufacturers Association (BHMA) "Recommended Locations for Builders Hardware".
   4. National Fire Protection Association, Inc. (NFPA) NFPA 80 "Standard for Fire Doors and Windows", and NFPA 101 "Code for Safety to Life from Fire in Buildings and Structures"
   5. Underwriters Laboratories, Inc. (UL), Building Materials Directory.

1.04 SUBMITTALS

A. Submit the following in accordance with Section 01340:
   1. Hardware Schedule:
      a. Provide hardware schedule list in "Hardware Groups" listing complete designation of every item required for each door opening.

         1) List and describe each opening separately; except for hand, include doors with identical hardware in a single heading unless specified otherwise.

Include door number, room designations, degree of swing, and hand.

2) List of hardware items; include manufacturer's name, quantity, product name, catalog number, size, finish, attachments, and related details where applicable.

c. Number hardware groups same as numbers specified herein. If variation is required or desired by the scheduler use suffix letters with the numbers or similar method to keep scheduled numbers specified herein in sequence.

1.05 QUALITY ASSURANCE

A. Manufacturer: To the greatest extent possible, obtain each kind of hardware from only one manufacturer, even though several are indicated as acceptable manufacturers.

B. Hardware supplier shall be an authorized distributor of manufacturers listed. Hardware work shall be done under the direct supervision of a certified Architectural Hardware Consultant.

C. Hardware supplier shall be responsible for thoroughly detailing the Project to assure that the items specified will properly function in the indicated locations.

D. Furnish UL and Warnock-Hersey listed hardware for labeled openings and 20 minute openings in conformance with requirements for the class of opening scheduled. These requirements have precedence over this Specification where conflict exists.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver hardware to the job site in manufacturer's original containers marked to correspond with the final hardware schedule for installation location, and store in dry surroundings.

B. Provide secure lock-up for hardware delivered to the Project but not yet installed. Control the handling and installation of hardware items which are not immediately replaceable so that the completion of the work will not be delayed by hardware losses, both before and after installation.

C. Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thicknesses, profile, swing, security and similar requirements indicated, as necessary for proper

installation and function. Deliver individually packaged hardware items at the proper times to the proper locations (shop or Project site) for installation.

D. Furnish a copy of the final hardware schedule and pertinent hardware templates or template information to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware. Upon request, check the shop drawings of such other work to confirm that adequate provisions are made for the proper installation of hardware.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Finish Hardware: Refer to Hardware Schedule.

2.02 ACCESSORIES AND ATTACHMENTS

A. Furnish hardware with screws, throughbolts and other fastenings suitable to assure permanent anchorage. Where exposed, fastenings shall be countersunk oval-head type, (except use flat-head for hinges), and shall match finish of hardware being attached. Provide concealed fastenings wherever possible. Hardware shall not be attached with self-tapping screws and sheet metal screws. Door closers, closer arms, door holders, holder arms and door stops shall be secured to doors with plated head sex bolts with smooth head to exterior. Floor type stops and holders shall be fastened to the floor with machine screws into expansion shields.
   1. Items for application to metal shall be furnished with machine screws. Items for application to concrete and masonry shall be furnished with machine screws and expansion shields. Items for application to wood shall be furnished with wood screws. Screws for items applied on gypsum board and plaster shall be sufficiently long to provide solid connection to framing/backing behind the plaster and gypsum board.
   2. Exposed fastenings shall be finished to match the items fastened. Fastenings shall be the same metal as the item fastened except that fastenings for aluminum items shall be brass or stainless steel.
   3. Hardware and fastenings for application to fire doors shall be Underwriter's Laboratories or Warnock-Hersey approved and listed, as applicable.

2.03 FINISHES

A. The following finishes are indicated in the hardware sets:
   1. US10A Dark Bronze, Lacquered
   2. US10B/102 Dark Bronze, Oil Rubbed
   3. STAT Statuary Bronze, Lacquered

4. US26D/264 Satin Chrome
5. US32D/324 Satin Stainless Steel
6. USP Prime Coated

2.04 KEYING INFO

A. Change Key and Masterkey locks and lock cylinders as directed by the Owner.

B. Master Keying:
   1. 2 change Keys per lockset
   2. 6 Master keys "AA" for each master set.
   3. Construction master keys.

C. Ship Masterkeys to the Owner via Registered Mail.

2.05 EXCEPTIONS

A. Hardware items not included in the hardware schedule:
   1. No cabinet hardware
   2. No window hardware
   3. No bath accessories
   4. No room numerals and signs
   5. No marble thresholds
   6. No hardware for aluminum doors (except cylinders)
   7. No hardware for desks-tables-counters

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install each hardware item in compliance with the manufacturer's printed instructions and recommendations. Wherever cutting and fitting is required to install hardware onto and into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.

B. Set units level plumb and true to the line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

C. Install hardware on UL labeled openings in accordance with manufacturer's requirements, to maintain the label.

D. Mortise and cut to close tolerance and conceal evidence of cutting in the finished work.

E. Install closers on the room side of corridor doors, stair side

of stairways, and interior side of exterior doors.

F. Cut and fit threshold and floor covers to profile of door frames, with mitred corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.

G. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

H. Mounting heights:
   1. Install hardware at mounting heights conforming to the recommended mounting locations of the Builders' Hardware Manufacturers Association.
   2. Install wall stops WB11X, and wall holders W20X to strike near top of doors, but not more than 78" from the finished floor line; install wall stops 50W and 60W to engage knobs, levers and pulls.

I. Deliver to the Owner 1 (one) complete set of installation and adjustment instructions, and tools as furnished with the hardware.

3.02 ADJUSTING AND CLEANING

A. At final completion, adjust and check each operating item of hardware and each door to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if not specifically recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

   1. Door closers, exit devices and electronics (if any) shall be checked by the hardware distributor for proper operation.

B. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes during the final adjustment of hardware.

C. Clean hardware to restore the original finish.

END OF SECTION

SECTION 08800
GLAZING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Glass glazed into frames (except factory glazed windows).

B. Frameless mirrors.

C. Setting materials and cleaners.

1.02 RELATED SECTIONS

A. Section 10820 - Toilet Accessories: For framed mirrors.

B. Section 08410 – Aluminum entrance storefront.

1.03 QUALITY ASSURANCE

A. Unless otherwise shown, or governed by other reference standards specified, conform with details and procedures of the "Glazing Manual”, current Edition (Flat Glass Marketing Association).

B. American National Standard Institute (ANSI) Z97.1.
   1. Each piece of safety glass shall exhibit appropriate label.

C. Consumer Product Safety Commission (CPSC), "Safety Standards for Architectural Glazing Materials".

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver glazing materials to Project site in manufacturer's unopened containers, fully identified with trade name, color, size, hardness, type, class, and grade. Store each item in accordance with manufacturer's instructions. Damaged and otherwise unsuitable material, when so determined, shall be immediately removed from the Project site.

1.05 PROJECT CONDITIONS

A. Maintain a minimum temperature of 40 degrees F. during glazing unless the manufacturer of the glazing materials specifically agrees to installation of specified materials at lower temperatures. If job progress and other conditions require glazing work when temperatures are below 40 degrees F. (or below the minimum temperature recommended by the manufacturer), consult the manufacturer and establish the minimum provisions required to ensure satisfactory work. Record in writing to the manufacturer, with copy to the Architect, the conditions under which such glazing work proceeds, and the provisions made to ensure satisfactory work.

1.06 WARRANTY

A. The Contractor shall warrant in writing, that the insulating glass units and mirrors will be free of faults and defects in accordance with the General Conditions, except the warranty period shall be extended by the manufacturer's warranty of these products as follows:
   1. Insulating Glass: 5 years against material obstruction of vision between interior glass surfaces.
   2. Mirrors: 15 years against silver spoilage.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Primary Glass Prodcuts and Insulated Units:

   1. Libbey-Owens-Ford Co.
   2. PPG Industries, Inc., Glass Group

B. Other Materials: As specified in Article 2.02.

2.02 MATERIALS

A. Clear Float Glass: ASTM C1036, Type 1, Class 1, Quality q3, 1/4" thick, clear.

B. Tempered Float Glass: Float glass which has been heat strengthened (fully tempered) to achieve strength 4 to 5 times stronger than regular annealed glass, complying with ASTM C1048 and ANSI-Z97.1. Glass shall be tempered horizontally. (Tong marks at top only will be permitted.)

C. Insulating Glass: 1" insulating glass complying with ASTM E774 tested and approved in accordance with SIGMA, Sealed Insulating Glass Manufacturers Association requirements. Provide following where shown:
   1. Type A: 1/4" tinted glass outboard, 1/2" air space and 1/4" clear glass inboard.
      a. Temper both panes where shown on Drawings and as required.
   2. Type B: Low-e

D. Mirror Glass: 1/4" thick, Quality q2, polished float glass mirror electrolytically copper plated with ground and polished edges and concealed fasteners.

E. Glazing Tape: Polyisobutylene/butyl "Tremco 440 Tape" (Tremco, Inc.); "Extru-Seal" (Pecora Corporation).

F. Setting Blocks: Neoprene blocks, 70 to 90 Type A durometer

hardness.

G. Spacers: Neoprene blocks, 40 to 50 Type A durometer hardness, 3" long, self-adhesive on 1 (one) face only.

H. Dry Glazing Gaskets: 50-70 durometer hardness, extruded or molded neporene, butyl or vinyl, color to match aluminum. Thickness and configuration to suit metal sections used to provide 15 percent minimum compression around seal. Miter corners.

J. Cleaners: Type recommended by gasket manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the framing and glazing channel surfaces, backing, removable stop design, and the conditions under which the glazing is to be performed, and notify the Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the glazing until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Measure openings and cut glass accurately to fit each opening with minimum edge clearances and bite on glass as specified by FGMA. If glass is to be cut to size at Project site, deliver each piece to Project at least 2" larger (in both dimensions) than required, to facilitate the cutting of clean-cut edges without the necessity of seaming and nipping.
   1. Do not attempt to cut, seam, nip, and abrade glass which is tempered, heat strengthened, and coated.

B. Clean glazing stops and rabbets to receive glazing materials of obstructions and deleterious substances which might impair the work.

3.03 INSTALLATION

A. Unify appearance of each series of lights by setting each piece to match others as nearly as possible. Set each piece with pattern, draw and bow oriented in the same direction as other pieces.

B. Inspect each piece of glass immediately before installation. Pieces which have significant impact damage at edges, scratches and abrasion of faces, and other evidence of damage shall not be installed.

C. Locate setting blocks at the quarter points of sill, but no

closer than 6" to corners of glass. Use blocks of proper size to support the glass in accordance with manufacturer's recommendations.

D. Provide spacers for glass to separate glass from stops, except where continuous gaskets or tape are required. Locate spacers 36" o.c. maximum inside and out, with a minimum of 2 spacers per edge of glass. Provide width as required for minimum of 3/8" bite on glass at all 4 edges.

E. Butt or lap ends of sealant tape in accordance with the manufacturer's recommendations.

F. Install mirrors plumb and level using concealed fasteners.

3.04 ADJUSTING AND CLEANING

A. Protect glass from breakage immediately upon installation. Use streamers or ribbons suitably attached to framing and held free of the glass. Warning markings shall not be applied directly to the glass.

B. Remove and replace glass which is broken, cracked, chipped, or damaged in any way and from any source, including vandalism and accidents during the construction period.

C. Maintain glass in a reasonably clean condition during construction so that it will not become stained.

D. Wash and polish glass on all faces just prior to final acceptance. Comply with instructions and recommendations of the glass manufacturer for cleaning.

END OF SECTION

SECTION 09250
GYPSUM WALLBOARD

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Gypsum wallboard and sheathing.

B. Metal suspension system.

C. Accessories and joint materials.

D. Acoustical sealant.

1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

A. Acoustical insulation is specified in Section 09530.

1.03 RELATED SECTIONS

A. Section 05400 - Rough Carpentry

B. Section 09530 - Acoustical Insulation.

1.04 QUALITY ASSURANCE

A. Gypsum wallboard construction shall comply with laws, ordinances, rules, regulations and orders of governing authorities having jurisdiction over this part of the Work.

B. To the greatest extent possible, obtain materials from 1 (one) manufacturer to promote single source responsibility.

C. Installer shall be acceptable to the manufacturer of the wallboard materials.

D. Where gypsum drywall systems with fire-resistance ratings are indicated and where required to comply with governing regulations, provide materials and installations identical with applicable assemblies which have been tested and listed by recognized authorities, including UL, FM and A.I.A.

E. Comply with the provisions of the following codes, specifications and standards except where more stringent requirements are shown on the Drawings or specified herein:
   1. Gypsum Association (GA) "Recommended Specifications for the Application and Finishing of Gypsum Wallboard," GA-216, unless otherwise specified herein.
   2. Gypsum Association (GA) "Recommended Specification: Levels of Gypsum Board Finish" GA-214 jointly published by AWCI, CISCA, GA, and PDCA.
   3. ASTM C645-88 "Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board".
   4. ASTM C754-88 "Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum".

1.05 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to the Project site in their original, unopened containers or bundles and stored in a place providing protection from damage and exposure to the elements. Damaged and otherwise unsuitable material, when so determined, shall be immediately removed from the Project site.

1.06 PROJECT CONDITIONS

A. For nonadhesive attachment of gypsum board to framing, maintain not less than 40 degrees F. For adhesive attachment and finishing of gypsum board maintain not less than 50 degrees F. for 48 hours prior to application and continuously thereafter until drying is complete. Installation shall not be started until windows are glazed, doors installed and openings temporarily closed. Ventilation shall be provided to remove excess moisture during joint treatment.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Gypsum Wallboard: Tapered edge, 1/2" thick, unless noted otherwise on the Drawings.
   1. Regular: ASTM C36-85
   2. Water resistant: ASTM C630-85

B. Gypsum Sheathing: Square edge, 1/2" thick for 16" stud spacing and 5/8" for 24" stud spacing, ASTM C79-87.

C. Screws: Type S and S-12 buglehead and panhead, sized to suit thickness.
   1. Corrosion resistant treated, or stainless steel.

D. Adhesive: As recommended by the gypsum wallboard manufacturer.

E. Steel Studs and Runners: ASTM C645-83.
   1. Light Gage Steel Framing: 20 gage (.0329" minimum) and 25 gage (.0179" minimum) hot dipped galvanized studs, runners, and related components, sizes as shown.

F. Metal Furring Channels: 24 gage, electro-galvanized steel, hat-shaped, sizes as shown on the Drawings.
   1. Where shown as "Resilient", provide manufacturer's special type designed to reduce sound transmission.

G. Cold-Rolled Channels:
   1. 3/4" 300 lbs. per 1000 lin. ft.
   2. 1-1/2" 475 lbs. per 1000 lin. ft.

H. Clips: Galvanized steel wire or sheet metal devices designed for attachment of furring members to supports or to each other.

I. Wire Ties: Soft galvanized steel wire, not less than 16 gage for tying furring channels to runner channels, and not less than 18 gage for other ties.

J. Hangers: 8 gage annealed, galvanized wire.

K. Backer Plates: 20 gage, galvanized per ASTM B633, Type RS or heavier, sizes as required, for fastening to channels for attachment of fixtures, accessories, and similar items.

L. Accessories: Corner reinforcements, casing beads and metal trim, fabricated from .012" (minimum) galvanized sheet steel with perforated flanges, designed to receive joint compound.

M. Control Joints: Roll-formed zinc, or extruded vinyl as standard with the wallboard manufacturer.

N. Joint Treatment Materials: ASTM C475.

O. Acoustical Sealant: Non-drying, permanently flexible, synthetic rubber based; "Acoustical Sealant BA-98" (Pecora Corp.); "Acoustical Sealant" (Tremco, Inc.); or gypsum wallboard manufacturer's sealant specifically developed for this use.

2.02 SYSTEMS

A. Steel Framed Gypsum Drywall:
1. "Gypsum Wallboard" (Georgia-Pacific Corp.).
2. "Gypsum Wallboard Construction" (Gold Bond Building Products Div., National Gypsum Co.).
3. "Gypsum Drywall" (United States Gypsum Co., USG Corp.).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Wood Studs and Framing:
1. Size and spacing of Studs: Comply with manufacturer's recommendations and as otherwise shown or specified herein.
a. Frame door openings with vertical studs securely attached by screws at each jamb either directly to frames or to jamb anchor clips on door frame; install runner track sections (for jack studs) at head and secure to jamb studs.
1) Provide runner tracks of same gage as jamb studs. Space jack studs same as partition studs.
2) Install 20-gage studs at each jamb for doors 2'-8" wide to 4'-0" wide weighing not more than 200 lbs.; and for doors less than 2'-8" wide weighing more than 100 lbs. but not more than 200 lbs.
3) Install double 20-gage studs at each jamb for single doors up to 4'-0" wide weighing more than 200 lbs. but not more than 300 lbs.
b. Frame openings other than door openings in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.
c. Space wall furring members 24" o.c., except as otherwise indicated.

2. Provide continuous tracks sized to match studs. Align runner tracks accurately to the partition layout at both floor and ceiling. Secure runner tracks as recommended by the stud manufacturer for the floor and ceiling construction involved, except do not exceed 24" o.c. spacing for nail or power-driven fasteners, nor 16" o.c. for other types of attachment. Provide fasteners at corners and ends of runner tracks.
   a. Isolation of Partitions from Structure: Where partitions abutt ceiling, deck construction and vertical structural elements, provide slip or cushion type joint between partition and structure as recommended by stud manufacturer to prevent the transfer of structural loads and movements to partitions.
   b. Extend partition stud system through acoustical ceilings and elsewhere as indicated to the structural support and substrate above the ceiling unless otherwise shown on the Drawings.
3. Install supplementary framing, blocking and bracing to support fixtures, equipment, services, heavy trim, furnishings and similar work which cannot be adequately supported on gypsum board alone.

B. Metal Suspension System:
1. Secure hangers to structural support by connecting directly to structure where possible, otherwise connect to inserts, clips or other anchorage devices or fasteners as indicated.
2. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
3. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
4. Wire-tie or clip furring members to main runners and to other structural supports as indicated.
5. Attach perimeter wall track or angle wherever support system meets vertical surfaces.
6. Do not bridge building expansion joints with support system; frame both sides of joints with furring and other support as indicated.

C. Direct-hung Metal Support System:
1. Attach perimeter wall track or angle wherever support system meets vertical surfaces. Mechanically join support members to each other and butt-cut to fit into wall track.

D. Wallboard:
   1. Install acoustical insulation as indicated, prior to gypsum board unless readily installed after board has been installed.
   2. Locate exposed end-butt joints as far from center of walls and ceilings as possible, and stagger not less than 1' -0" in alternate courses of board.
   3. Install ceiling boards in the direction and manner which will minimize the number of end-butt joints, and which will avoid end joints in the central area of each ceiling. Stagger end joints at least 1 -0".
   4. Install wall/partition boards perpendicular to framing (long edges of board at right angles to framing members) for walls 8'-1" and less in height using maximum length sheets possible to minimize end joints. If ceiling height is greater than 8'-1", or wall is 4'-0" wide or less, install wall/partition boards parallel to framing (long edges of board parallel to framing members). In fire rated assemblies, verify installation procedures with manufacturer.
      a. On partitions/wall 8' -1" or less in height install gypsum board horizontally (perpendicular to framing); use maximum length sheets possible to minimize end joints.
      b. Gypsum board joints at openings shall be located so that no joint will align with edges of opening unless control joints will be installed at these points.
   5. Install exposed gypsum board with face side out. Do not install imperfect, damaged and damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.
   6. Locate either edge or end joints over supports, except in horizontal applications or where intermediate supports or gypsum board back-blocking is provided behind end joints. Position boards so that like edges abut, tapered edges against tapered edges and mill-cut or field-cut ends against mill-cut or field cut ends. Do not place tapered edges against cut edges and ends. Stagger vertical joints over different studs on opposite sides of partitions.
   7. Attach gypsum board to framing and blocking as required for additional support at openings and cutouts.
   8. Form control joints and expansion joints with space between edges of boards, prepared to receive trim

accessories.

9. Cover both faces of steel stud partition framing with gypsum board in concealed spaces (e.g. above ceilings), except in chase walls which are braced internally.
   a. Except where concealed application is required for sound, fire, air and smoke ratings, coverage may be limited to not less than 75 percent of full coverage.
10. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4" to 1/2" space and trim edge with J-type semi-finishing edge trim. Seal joints with acoustical sealant. Do not fasten drywall directly to stud system runner tracks.
11. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum board with "floating" internal corner construction, unless isolation of the intersecting boards is indicated, unless control and expansion joints are indicated, and unless fire rating is indicated.
12. Space fasteners in gypsum boards in accordance with GA-216 and manufacturer's recommendations, except as otherwise indicated.
13. Wall Tile Base: Where drywall is base for thin-set ceramic tile and similar rigid applied wall finishes, install water resistant gypsum wallboard.
   a. At plumbing walls and similar "wet" areas, install water resistant wallboard. Apply with un-cut long edge at bottom of work, and space 1/4" (minimum) above fixture lips. Seal ends, cut-edges and penetrations of each piece with water-resistant sealer before installation as recommended by manufacturer.
14. Install gypsum board to radiused surfaces, furring or framing in accordance with manufacturers recommendations for thicknesses shown. Moistening the face and back papers thoroughly allowing water to soak into the core of the board may be used as a method to obtain radii shorter than published recommendations.
15. Laminate gypsum wallboard to masonry and concrete surfaces in accordance with wallboard manufacturer's instructions using recommended adhesives.
16. In addition to sealing of joints specified in Subparagraph 3.01.D.10, seal the perimeter of, and openings in drywall construction containing acoustical insulation, with acoustical sealant.

E. Sheathing: Screw attach sheathing to exterior studs with corrosion-resistant screws at 8" o.c. and 3/8" from ends and edges.

F. Accessories:
1. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.
   a. Install metal corner beads at external corners of drywall work.
   b. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where semi-finishing type is indicated.
2. Install metal or vinyl control joints where indicated, but not to exceed 30' o.c. maximum for walls and 50' o.c. maximum for ceilings whether indicated or not. Ceilings in addition shall not exceed 2500 s.f.

G. Wallboard Finishing:
1. General: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare work for decoration. Prefill open joints, rounded and beveled edges, if any, using type of compound recommended by manufacturer.
   a. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
   b. Sand after last coat, between coats if necessary to produce desired finish.
   c. Wallboard finishing including joint treatment and nail or screw dimple treatment shall be complete to finished floor.
2. Levels of finishing shall comply with those established by reference in GA-214 except as follows:
a. Level 4: In finished spaces scheduled for painting, and wallcoverings classified as Grades I and II.
b. Level 3: For finished spaces scheduled for wallcoverings classified as Grade III.
c. Level 2: For wallboard scheduled to receive ceramic tile, and in exposed spaces not painted.
d. Level 1: For concealed spaces, except where additional finishing is required to achieve fire-resistance

rating, sound rating and where acting as an air or smoke barrier, meet Level 2 finishing requirements.

3.02 PROTECTION

A. Advise Contractor of required procedures for protecting gypsum drywall work from damage and deterioration during remainder of construction period.

END OF SECTION

SECTION 09510
ACOUSTICAL
CEILINGS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Lay-in acoustical ceilings.

B. Suspended ceiling grid.

1.02 RELATED SECTIONS

A. Division 15 - Mechanical

B. Division 16 - Electrical

1.04 QUALITY ASSURANCE

A. Installer: Firm with not less than 3 years of successful experience in installation of acoustical ceilings similar to requirements for this Project.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the Project site in manufacturer's unopened containers, clearly indicating manufacturer's name, brand, type, style, size, color, texture and other identifying information.

B. Store materials in a dry location, off the ground to prevent damage, deterioration, and intrusion of foreign matter. Replace materials which have been damaged or are otherwise unsuitable. When so determined, immediately remove damaged and otherwise unsuitable material from the Project site.

1.06 PROJECT CONDITIONS

A. Do not install interior acoustical ceilings until space is enclosed and weatherproofed, until wet work in space is completed and nominally dry, until work above ceilings is completed, and until ambient condition of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

1.07 EXTRA STOCK

A. Furnish Owner at least 1 carton of additional acoustical units clearly identified, of each type used on the Project over and above the amount installed.

B. Deliver to Owner at time of final inspection of work under this Section and store where directed in the building.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. For Acoustical Panels:
1. Armstrong World Industries, Inc.
2. The Celotex Corp.
3. USG Interiors, Inc., USG Corp.

B. For Suspension Systems:
1. Armstrong World Industries, Inc.
2. Chicago Metallic Corp.
3. USG Interiors, Inc., USG Corp.
4. National Rolling Mills, Inc.

2.02 MATERIALS

A. Acoustical Panels:
1. Type 1: Gypsum core with medium testuredlay-in panel by USG Interiors.
a. Size: 24" x 24" x 5/8".
b. Edge Treatment: Tegular.
c. Surface Treatment: Stipple Pattern.
d. Color: White.

B. Exposed Suspension Systems:
C.
1. Type 1: Direct-hung, fire rated, double web steel suspension system complete with main tees, cross tees, splices, wall moldings and accessories.
a. Structural Classification: Intermediate-duty systems unless otherwise required by acoustical panels or fixtures and other items supported thereon.
b. Finish: Factory standard applied white (satin) enamel.

2. Type 2: Direct-hung, non-fire rated, double web, roll-formed aluminum suspension system complete with main tees, cross tees, splices, wall moldings and accessories.
a. Structural Classification: Light-duty system.
b. Finish: Aluminum cap with factory applied painted finish; white (satin) enamel.

3. Hold-Down Clips: Provide hold-down clips for lay-in ceiling units weighing less than 1 (one) lb. per sq. ft., for units in vestibules and public toilet rooms, and for units within a 20 foot radius of doors to the exterior of the building without vestibules.

C. Hangers: Soft steel wire, 12 gage, galvanized.

PART 3 - EXECUTION

3.01 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid the use of less-than-half width units at borders, and comply with reflected ceiling plans wherever specifically shown
on the Drawings.

3.02 INSTALLATION

A. General:
   1. Install materials in accordance with manufacturer's printed instructions.
   2. Comply with governing regulations, fire resistance rating requirements where indicated, and industry standards applicable to the work; and meet the requirements specified herein.
   3. The finished system shall be true and level, and panels shall be installed so as to form straight true lines and cross lines. Adjacent panels shall match in appearance and shall be from 1 (one) "factory run".
   4. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.
      a. Install panels with pattern running in one direction.
   5. Frame access panels and other openings on 4 sides with 1-1/2" runner channel; each frame to be supported by a hanger at each end.

B. Install suspension systems to comply with ASTM C636, with hangers supported only from building structural members. Locate hangers near each end and spaced 4'-0" along each carrying channel and direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0".
   1. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age and elevated temperatures.
      a. Space hangers not more than 6" from ends, not more than 4'-0" o.c. between ends of main runners, and as required to support other work resting in and on ceiling. Where spans exceed the recommended and specified spans, furnish larger main runners or additional reinforcing.
      b. Do NOT attach hangers to metal decking under any circumstances.
   2. Coordinate spacing of hangers, carrying channels, runners,

and moldings with the location of electrical fixtures and other items occurring in and on ceilings.

3. System shall not be supported from electrical conduit, mechanical ducts, pipes, and equipment.
4. Do not bear main runners on walls and partitions.
5. Miter grid corners. Provide finish channels at exposed edges. Center runners to align with architectural elements, light fixtures, and similar visual components. Obtain Architect's approval of layout before beginning construction if layout is not specifically shown on the Drawings.
   a. Screw-attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.

C. Install acoustical panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.

D. Install hold-down clips spaced as indicated by panel manufacturer unless otherwise required by code.

E. Fixture Protection: Using acoustical lay-in panels specified, form protective hoods over lights and other accessories recessed into the ceiling system in accordance with the UL Design system shown, if any.

3.03 ADJUSTING AND CLEANING

A. Adjust hanger lengths if necessary to correct deflections caused by installation of panels, light fixtures, and other equipment in plenum following original leveling of grid system.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Painting interior and exterior exposed items and surfaces shown and otherwise scheduled to be painted.

B. Surface preparation, priming and coats of paint specified in addition to shop-priming and surface treatments specified under other Sections of the Work.

C. Field painting of exposed bare and covered pipes and ducts (including color coding), and of hangers, exposed steel and iron work, and primed metal surfaces of equipment installed under the mechanical and electrical work in paint finished spaces.

D. The following categories of work are not included as part of the field-applied finish work:
   1. Shop priming specified in other Sections.
   2. Mechanical and electrical work except exposed in painted spaces.
   3. Prefinished items
   4. Finished metal surfaces
   5. Operating parts and labels
   6. Copper, brass, bronze, aluminum, stainless steel and other nonferrous metals.
   7. Face brick, ceramic tile, structural glazed units, stones, marble and other similar items.
   8. Work identified in Article 1.02 below.

1.02 RELATED SECTIONS AND DIVISIONS

A. Section 07182 - Water Repellent

B. Section 09960 - Vinyl Wall Covering

C. Division 15 - Mechanical

D. Division 16 - Electrical

1.03 DEFINITIONS

A. "Paint" as used herein means coating systems, materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

1.04 QUALITY ASSURANCE

A. Conform to the recommendations of the Painting and Decorating Contractors of America (PDCA) for Premium Grade work, unless

otherwise specified herein.

B. Material Quality: Provide the manufacturer's best quality trade sale paint material of the various coating types specified.
   1. Each product container shall bear manufacturer's legible label indicating manufacturer's name, type of material, product number, batch number, color, and instructions for reducing where applicable.
   2. Paint material containers not displaying manufacturer's product identification will NOT be acceptable.

C. Single Source Responsibility: Provide primers and undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only within recommended limits.

D. Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other Sections of these Specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to ensure compatible prime coats are used. Provide barrier coats over incompatible primers or remove and reprime as required. Notify the Architect, in writing, of anticipated problems using specified coating systems with substrates primed by others.

E. Proprietary names used to designate colors of materials are not intended to imply that products of the named manufacturers are required to the exclusion of equivalent or better products of other manufacturers.

F. No claims as to the suitability of materials specified, or the applicator's inability to produce first class finishes with these materials will be considered unless such claims are made in writing prior to the start of the painting work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Receive paint materials only in unopened, original containers with labels intact. Store materials on the site in an approved location. Damaged or otherwise defective material when so determined, shall be immediately removed from the Project site.

1.06 PROJECT CONDITIONS

A. Finishes shall not be applied in rain, snow, fog, or mist, or when the relative humidity exceeds 85 percent. Finishes other than water-thinned coatings shall be applied only to surfaces that are completely free of surface moisture as determined by

sight or touch. Finishes shall not be applied when the temperature of the surfaces to be painted and of the surrounding atmosphere is below 50 degrees F. for other coatings, or when the temperature is expected to drop to 32 degrees F.

B. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

1.07 EXTRA STOCK

A. Extra stock is not required for this Project, however all partially used containers of paint as well as unopened containers of paint, shall be presented to the Owner at the completion of the Project and stored in the building at the Owner's direction unless otherwise requested by the Owner.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Acceptable brands of best quality grade paints, stains, varnishes, sealers and coatings equal or better than those scheduled herein are acceptable as follows:
   1. General Coatings:
      a. Benjamin Moore and Co.
      b. Porter Paints.
      c. Devoe & Raynolds Co.
      d. The Glidden Co.
      e. PPG Industries, Pittsburgh Paints
      f. Pratt & Lambert (P & L)
      g. The Sherwin-Williams Co.
   2. Stains and Sealers:
      a. Pratt & Lambert
   3. Textured Coatings:
      a. Gold Bond Building Products Div., National Gypsum Co.
      b. United States Gypsum Co.

2.02 MATERIALS

A. Provide materials, brushes, tools, ladders, scaffolds, and other equipment kind necessary for the proper execution of each type of work.

B. Materials used on this part of the Work shall be as specified in Article 3.06 PAINT SCHEDULE.

C. Materials such as linseed oil, turpentine, and mineral spirits,

shall be pure and of highest quality.

2.03 COLORS

A. Prior to beginning work, obtain approval of colors for surfaces to be painted. Each coat of paint shall be slightly lighter or darker than the preceding coat. Colors may not necessarily be the manufacturer's standard colors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas and conditions under which painting is to be applied and notify the Contractor in writing of conditions detrimental to the proper and
timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. General:
   1. Remove and protect hardware, lighting fixtures, and similar items, before painting. Protect finished surfaces in areas where paint is being applied, with clean drop cloths and suitable masking.
   2. Clean surfaces to be finished as required to remove oil grease, dust and dirt. Sand where necessary to properly prepare surfaces to receive finish.

B. Surface Preparation:
   1. For Cementitious Materials: Prepare cementitious surfaces of concrete and concrete block by removing efflorescence, chalk, dust, dirt, grease and oils.
      a. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
   2. For Ferrous Metals: Clean ferrous surfaces which are not galvanized, and not shopcoated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
   3. For Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.
   4. For Wood: Clean wood surfaces to be painted of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off.

Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

a. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including interior millwork and trim.
b. When transparent finish is required, use spar varnish for backpriming.
c. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer (pigmented to be easily identifiable) immediately upon delivery to job.

5. For Gypsum Wallboard Surfaces: Fill scratches, nicks and uneven areas with joint compound or spackle, and sand flush with the surface.
6. For Existing Surfaces: Clean thoroughly to remove loose, scaley, and other defective film. Fill holes and cracks. Remove gloss from painted surfaces by washing and sanding, and touch up bare spots with appropriate primer.
7. Wood - Red Oak (Interior Stain Transparent)
   A. 1 coat Pratt & Lambert stain to match Laminart 3019-T.
   B. 1 coat Ptratt & Lambert filler sealer (omit on close grain woods).
   C. 2 coats Pratt & Lambert Varmor Clear finish.

8. Wood - Pine (Interior Stain - Trasparent)
   A. 1 coat Ollympic 909 Piine.

9. Wood - Pine (Interior Stain - Opaque)

C. Materials:
1. Mix and prepare painting materials in accordance with manufacturer's printed instructions.
2. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean conditions, free of foreign materials and residue.
3. Stir materials before application to produce a mixture of uniform density, and stir as required during the application of the materials. Do not stir surface film into the material. Remove the film and, if necessary, strain the material before using.

3.03 APPLICATION

A. Paint exposed surfaces whether or not colors are designated in the Paint Schedule, except where the natural finish of the material is specifically noted as a surface not to be painted. Where items and surfaces are not specifically mentioned, paint these the same as adjacent similar materials and areas. If color and finish is not designated, the Architect will select these from standard colors available for the materials systems specified.

B. Apply paint evenly and smoothly without runs, sags, brush marks, laps, streaks, unfinished patches and other blemishes.

C. Apply paint in accordance with manufacturer's directions. Use equipment and techniques best suited for substrate and type of material being applied.

D. Brush out flow on each coat as required by the characteristics of the materials, or recommended by the manufacturer.

E. Priming coat shall be of suitable type for each surface and compatible in each case with the finish paint.

F. Allow each coat to dry thoroughly before applying next coat.

G. The priming coat on concrete block shall be tinted to the approximate shade of the final coat. Suction spots or "hot-spots" in concrete, evident after the application of the first coating shall be touched-up before applying the second coat, to produce an even result in the finish coat.

H. Properly prepare and touch-up scratches, abrasions and other disfigurements and remove foreign matter before proceeding with the following coat. Spot-priming or spot-coating shall be featheredged into adjacent coatings to produce a smooth and level surface.

I. Final coats shall not be applied before other trades whose operations would be detrimental to finish painting have finished with their work in the areas to be painted.

J. Fill nail holes with suitable filler.

K. Finish recesses the same as adjoining rooms. Finish other surfaces the same as nearest or adjoining surfaces unless otherwise shown.

L. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment and furniture with prime coat only, before final installation of equipment.

M. Finish tops, bottoms and edges of doors.

N. If metal has been shop primed omit first coat, except for touch-up. Primer for touch-up shall be the same composition as shop primer.

O. Mechanical and Electrical Work:
   1. Painting of mechanical and electrical work is limited to those items exposed in occupied spaces.
   2. Paint exposed items, identical with room color, ceiling color or adjacent surfaces unless specifically noted otherwise.
   3. Mechanical items to be painted include, but are not limited to the following:
      a. Piping, pipe hangers, and supports
      b. Heat exchangers
      c. Tanks
      d. Ductwork, insulation
      e. Motor, mechanical equipment and supports
      f. Accessory items

   4. Electrical items to be painted include, but are not limited to, the following:
      a. Conduit and fittings
      b. Switchgear
   5. Paint interior surfaces of ducts, where visible through registers and grilles, with a flat, non-specular black paint.

P. Do not paint over code-required labels, such as Underwriters Laboratories and Factory Mutual, and over equipment identification, performance rating, name, and nomenclature plates.

3.04 ADJUSTING AND CLEANING

A. Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not in compliance with specified requirements, until such requirements are met.

B. At the completion of work of other trades, touch-up and restore damaged and defaced painted surfaces.
   1. Costs for this touch-up painting shall be charged to the trade responsible for such damage, and at no additional cost to the Owner.
   2. Notify the Contractor immediately upon such discovery.

C. During the progress of the work, remove discarded paint materials, rubbish, cans and rags from the Project site at the end of each work day.

D. Upon completion of painting work, clean window glass and other

paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch and otherwise damage finished surfaces.

3.05 PROTECTION

A. Protect work finished under this Section and the work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct damage by cleaning, repairing or replacing, and repainting.

B. Provide "Wet Paint" signs as required to protect newly-painted surfaces. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

3.06 PAINT SCHEDULES

A. Prior to beginning work, the Architect will furnish color chips for surfaces to be painted.

B. Provide the following paint systems for the various substrates as indicated:

1. Ferrous Metal (Exterior):
   a. 1 coat P & L Effecto Rust Inhibiting Primer
   b. 2 coats P & L Effecto Enamel

2. Ferrous Metal (Interior):
   a. 1 coat P & L Interior Trim Primer
   b. 1 coat P & L Vitralite Undercoating
   c. 1 coat P & L Vitralite Enamel, Eggshell

3. Metal Stairs and Ladders:
   a. 2 coats P & L Alkyd Gloss Floor Enamel

4. Galvanized Metal:
   a. 1 coat P & L Galvanized Metal Latex Primer
   b. 2 coats P & L Effecto Enamel

5. Concrete Masonry Unit (Exterior):
   a. 1 coat P & L Primafill 200
   b. 2 coats P & L Alkatite Cement & Stucco Paint

6. Wood (Exterior):
   a. 1 coat P & L Permalize Exterior Primer
   b. 2 coats P & L Permalize House & Trim Finish

7. Wood - Red Oak (Interior-Stained Transparent):
   a. 1 coat P & L Tonetic Wood Stain Cherry finish #S-33 (Stain other species of wood to match)
   b. 1 coat P & L Filler Sealer (omit on close grain woods)
   c. 2 coats P & L Varmor Clear Finish, Satin

8. Wood (Interior-Opaque):
   a. 1 coat P & L Interior Trim Primer
   b. 1 coat P & L Cellu-Tone

9. Gypsum Board:
   a. 1 coat P & L Latex Vinyl Acrylic Wall Primer
   b. 2 coats P & L Cellu-Tone
   c. Delete finish coats in tenant spaces; prime only.

10. Gypsum Board (Texture Ceilings):
    a. 1 coat P & L Latex Vinyl Acrylic Wall Primer
    b. 1 coat USG Imperial QT E-Z Spray Texture Finish, medium orange peel effect.

11. Existing Surfaces:
    a. Verify existing finishes before applying systems specified above.
    b. Alternative primers and finish coats may be necessary to provide compatibility with existing finishes.
    c. If substrate is not among those specified above, notify Architect for direction.

END OF SECTION

SECTION 10520
FIRE EXTINGUISHERS,
CABINETS, AND
ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Portable fire extinguishers.

B. Fire extinguisher cabinets.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry: For installation of fire extinguishers and cabinets.

B. Section 09900 - Painting: For field painting over factory primed finish.

1.04 QUALITY ASSURANCE

A. Fire extinguishers shall be approved by the Underwriters Laboratories Inc., Factory Mutual, State Fire Marshal's Office and local regulatory agencies.

B. Provide portable fire extinguishers, cabinets and accessories by 1 (one) manufacturer, unless otherwise specified.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. J.L. Industries

B. Larsen's Manufacturing Co.

2.02 MATERIALS

A. Cabinets shall be recessed type, steel construction with break glass door glazing and lock/clear acrylic door glazing.
   1. Extinguisher Cabinet: "Ambassador Series" Model 1015-V10 (recessed) and 1012-V10 (semi-recessed). (J.L. Industries).
   2. Finish: Manufacturer's standard primer paint finish compatible with field applied paint coating specified in Section 09900 - Painting.

B. Wall Bracket: Provide manufacturer's standard bracket designed to prevent accidental dislodgement of extinguisher, of proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.

C. Extinguishers as: (As required by governing authorities or as follows)

1. Extinguishers for areas except kitchen and food prep shall be multi-purpose, dry chemical type with a minimum UL rating of 3A-40BC: "Cosmic 5X (J.L. Industries); "MP5" (Larsen's Manufacturing Co.).
2. Extinguishers located in kitchen and food prep shall be minimum UL5BC rated.
3. Extinguisher bodies and valve assemblies shall be all metal construction. Plastic components are NOT acceptable.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install cabinets and extinguishers in accordance with manufacturer's instructions.
   1. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb.
   2. Locate bottom of cabinets 36" above finished floors.

END OF SECTION

SECTION 10820
TOILET ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Toilet accessories.

1.02 RELATED SECTIONS

A. Section 06200 - Finish Carpentry.
B. Section 08800 - Glazing; for custom size mirrors.
C. Section 10165 - Plastic Laminate Toilet Partitions.

1.03 DELIVERY, STORAGE AND HANDLING

A. Deliver and handle toilet accessories in such a manner as to prevent damage; store in a secure place. Accessories shall be in original packaging with seals unbroken and shall bear the name of the manufacturer and product. Damaged and otherwise unsuitable items, when so determined, shall be immediately removed from the Project site.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Bobrick Washroom Equipment Co., Inc.

B. Bradley Corp.

2.02 MATERIALS

PUBLIC HANDICAPPED-MEN AND WOMEN

A. Mirrors: Stainless steel framed mirror; mounting height 40" maximum to bottom; one of the following:
   1. No. B-165 2430 (Bobrick)
   No. 720 - 24 x 30 (Bradley)

B. Grab Bars: Straight bar, 1-1/2" diameter; mounting height 33" minimum; one each of the following if shown on the Drawings:
   1. No. B-6206 x 36, and 42 (Bobrick)
   2. No. 812-001 x 36, and 42 (Bradley

2.03 FABRICATION

A. Fabricate toilet accessories of Type 302, or 304 stainless steel, satin finish, unless otherwise specified or approved.

B. Omit manufacturer's labels and imprinted names.

C. Provide accessories produced by one manufacturer unless otherwise specified, or approved.

D. Furnish fastening devices, including screws, bolts, anchors, and backplates. Match exposed portions of fastening devices with that of accessories.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Check wall opening for correct dimensions, plumbness of blocking and frames, and other preparation that would affect installation of accessories.

B. Check areas to receive surface mounted units for conditions that would affect quality and execution of work.

C. Verify spacing of plumbing fixtures and toilet partitions that affect installation of accessories.

D. Do not begin installation of washroom accessories until openings and surfaces are acceptable.

3.02 INSTALLATION

A. Install toilet accessories in accordance with the manufacturer's instructions.

B. Install toilet accessories only to finished surfaces and after contiguous work has been completed.

C. In any one space, accessories shall be of matching design and finish.
If accessories vary in this regard, they shall be referred to the Architect for approval before being installed.

D. Install accessories at locations and heights indicated, level and plumb.
All exposed fasteners to be tamper-proof. Finish of exposed fasteners to match items secured.

E. Install manufacturer's recommended concealed anchor system for grab bars complete with stainless steel screws.

F. Conceal evidence of drilling, cutting and fitting on adjacent finishes.

G. Fit flanges of accessories snug to wall surfaces. Provide for caulking in gaps between 90 degree return flanges and finish wall surface after accessories are installed.

3.03 ADJUSTING AND CLEANING

A. Adjust accessories for proper operation.

B. Protect toilet accessories from damage after being installed. Before acceptance by Owner, clean and restore finishes; replace defective parts or units. Remove all packing material and construction debris and leave area broom clean.

C. Deliver accessories schedule, keys and parts manual as part of project close-out documents. For Owner's permanent records, provide 2 sets of the following items of manufacturer's literature:
   1. Technical data sheets of each item used for the Project.
   2. Service and parts manuals.
   3. Name of local representative to be contacted for field service or consultation.

END OF SECTION

SECTION 13121

PRE-ENGINEERED BUILDINGS

PART 1 -- GENERAL

1.1 SECTION INCLUDES:

A. Structural steel frame, including wall framing system.

B. Complete roof covering system consisting of the exterior roof panels, panel attachments, sealant, mastics, trim and flashing as required.

C. Complete wall covering system consisting of the exterior wall panels, panel attachments, sealant, mastics, trim and flashing as required for a weathertight assembly.

D. Field seaming machine.

E. Wall accessories, including:

1. Service doors
2. Windows
3. Louvers

F. Roof accessories, including:

1. Facade systems
2. Translucent roof panels
3. Gravity ventilators
4. Ridge ventilators
5. Roof curbs
6. Roof walkways

1.2 RELATED SECTIONS

A. Section 03300 -- Cast-in-Place Concrete: Foundations and anchor bolts.

B. Section 08110 – Steel Doors and Frames.

C. Section 08510 – Aluminum Entrances and Storefronts

D. Section 08520 – Aluminum Windows

1.3 REFERENCES

A. AAMA 101 -- Voluntary Specification for Aluminum and Poly-Vinyl Chloride (PVC) Prime Windows and Glass Doors; American Architectural Manufacturers Association.

B. ASTM A36/ASTM A36M -- Standard Specification for Carbon Structural Steel.

C. ASTM A 307 -- Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.

D. ASTM A 325 -- Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

E. ASTM A 529/A 529M -- Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.

F. ASTM A 570/A 570M -- Standard Specification for Steel, Sheet and Strip, Carbon, Hot-Rolled, Structural Quality.

G. ASTM A 572/A 572M -- Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Steel.

H. ASTM A 653/A 653M -- Standard Specification for Steel Sheets, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

I. ASTM A 792/A 792M -- Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

J. ASTM D 635 -- Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position.

K. ASTM D 1929 -- Standard Test Method for Ignition Properties of Plastics.

L. ASTM D 2843 -- Standard Test Method for Smoke from the Burning or Decomposition of Plastics.

M. ASTM E 84 -- Standard Test Method for Surface Burning Characteristics of Building Materials.

N. SDI 100 -- Recommended Specifications for Standard Steel Doors and Frames; Steel Door Institute.

O. UL 580 -- Tests for Wind Uplift Resistance of Roof Assemblies; Underwriters Laboratories

1.4 DEFINITIONS

A. Building Width -- Measured from outside to outside of sidewall girts.

B. Building Length -- Measured from outside to outside of endwall girts.

C. Building Line -- Outside face of horizontal steel girt.

D. Building Eave Height -- Measured from the intersection of the top of the roof framing and the outside of the wall framing to the bottom of the sidewall column base plate.

E. Bay Spacing -- Measured from centerline to centerline of primary frames for interior bays and from centerline of the first interior frame to outside of endwall girts for endbays.

F. Roof Pitch -- The ratio of the vertical rise to the horizontal run.

1.5 DESIGN REQUIREMENTS

A. Design structural systems according to professionally recognized methods and standards and legally adopted building codes.

B. Design under supervision of professional engineer licensed in the state of Missouri.

C. Manufacturer must be certified by AISC in the Metal Building category.

D. Supplier must be a primary manufacturer of frames, secondary steel, roof and wall sheeting and trim.

E. Design Loads:
1. Applicable Building Code: International Building Code.
2. Roof Live Load: 20 psf, non-reducible.
3. Roof Snow Load: 10 psf .
4. Roof Wind Load: Calculate in accordance with applicable code, using 80 mph Basic Wind Speed, Exposure Category 1, and Importance Factor of 1.25
5. Collateral Loads: 5 psf.
6. Seismic Loads: Calculate and apply seismic loads in accordance with the requirements of Standard Building Code based on the following project specific values as applicable:
   a. Seismic Zone: 3
   b. Importance Factor: 1
   c. Soil Profile Coefficient (S): S1
   d. Effective Peak Velocity Related Acceleration Coefficient (Av): .30
   e. Effective Peak Acceleration Coefficient (Aa) .15

7. Floor Load:
   a. Floor Live Load: 50
   b. Floor Dead Load: 50
   c. Floor Collateral Load: 5
   d. Floor Partition Load: 10

8. Dead loads, including the weight of all indicated permanent construction.

F. Design wall and roof panel system to withstand specified loads with deflection of 180 of span, maximum.

G. Anchor Bolts: Furnish design criteria for anchor bolts furnished by others, to resist the loads induced by the design loads on the structure.

1.6 SUBMITTALS

A. Design Data -- Provide detailed design criteria and calculations, sealed by registered engineer, licensed in the State of Texas.

B. Certification -- Manufacturer certification that the building conforms to the contract documents and manufacturer's standard design procedures.

C. Shop Drawings -- Show building layout, primary and secondary framing member sizes and locations, cross-sections, and product and connection details.

D. Product Data -- Information on manufactured products to be incorporated into the project.

E. Color Charts -- For selection of colors.

F. Anchor Bolt Installation Drawings -- Layouts with bolt diameters.

G. Specimen Warranty.

1.7 WARRANTY

A. Provide manufacturer's standard warranty for:

1. Materials and workmanship: 1 year.
2. Panel finish: 10 years.

PART 2 -- PRODUCTS

2.1 METAL MATERIALS

A. Select materials and material yield strengths based on building design requirements; use the following unless required otherwise.

B. Structural Steel Plate, Bar, Sheet, and Strip for Use in Bolted and Welded Constructions -- ASTM A 572/A 572M/A570, A 529/A 529M or A 36, with minimum yield strength of 50,000 psi.

C. Structural Steel Material for Use in Roll Formed or Press Broken Secondary Structural Members -- ASTM A 570/A 570M,or A607 with minimum yield strength of 55,000 psi.

D. Galvanized Steel Sheet for Roll Formed or Press Broken Roof and Wall Coverings, Trim and Flashing -- ASTM A 653/A 653M, with minimum yield strength of 50,000 psi.

E. Galvalume Steel Sheet Used in Roll Formed or Press Broken Roof Covering -- Aluminum-zinc alloy-coated steel sheet, ASTM A 792/A 792M, with minimum yield strength of 50,000 psi (345 MPa); nominal coating weight of 0.5 oz per sq ft (152 kg/sq m) both sides, equivalent to an approximate coating thickness of 0.0018 inch (0.05 mm) both sides.

F. Hot Rolled Steel Shapes -- W, M and S shapes, angles, rods, channels and other shapes; ASTM A 572/A 572M or ASTM A 36/A 36M as applicable; with minimum yield strengths required for the design.

G. Structural Bolts and Nuts Used with Primary Framing -- High strength, ASTM A 325.

H. Bolts and Nuts Used with Secondary Framing Members -- ASTM A 307.

I. Shop Coat -- Manufacturer's standard rust-inhibitive primer paint; manufacturer's standard color.

J. SP Pre-Painted Finish -- 0.8 mil baked on silicone polyester exterior surface.

1. Color: As selected from manufacturer's full line.
2. Interior finish: Off-white 0.5 mil (0.01 mm) washcoat.

2.2 FRAMING COMPONENTS

A. Primary Framing -- Continuous Beam (CB Series) solid web framing utilizing tapered or uniform depth beams or girders supported on uniform depth columns. Locate interior columns where indicated and design to support loads at bay spacings indicated.

B. Endwall Framing -- Corner posts, endposts and rake beams on south wall. Expandable endwall framing on north wall.

C. Purlins -- Zee-shaped; depth as required; with minimum yield strength of 55,000 psi (345 MPa); simple span or continuous span as required for design.

D. Girts -- Zee- or Cee-shaped; depth as required, with minimum yield strength of 55,000 psi; simple span or continuous span as required for design.

E. Wind Bracing -- Portal, torsional, diagonal bracing or diaphragm in accordance with manufacturer's standard design practices; utilizing rods, angles, and other members, with minimum yield strengths as required for design.

F. Primary Frame Flange Bracing -- Attached from purlins or girts to the primary framing, minimum yield strength as required for design.

G. Base Angles -- 2 inch x 3 inch x 0.059 inch steel angles, with minimum yield strength of 55,000 psi, anchored to the floor slab or grade beam with power driven fasteners or equivalent at a maximum spacing of 2 feet on center and not more than 6 inches from the end of any angle member.

I. Door Headers and Jambs -- Zee- or Cee-shaped; depth as required; with minimum yield strength of 55,000 psi.

J. Sag Angles and Bridging -- Steel angles, with minimum yield strength of 36,000 psi.

K. Fabrication -- Fabricate according to manufacturer's standard practice.

1. Fabricate structural members made of welded plate sections by jointing the flanges and webs by continuous automatic submerged arc welding process.
2. All welding operators and processes shall be qualified in accordance with the American Welding Society “Structural Welding Code”, AWS D1.1.

3. Field connections. Prepare members for bolted field connections by making punched, drilled, or reamed holes in the shop.

L. Component Identification -- Mark all fabricated parts, either individually or by lot or group, using an identification marking corresponding to the marking shown on the shop drawings, using a method that remains visible after shop painting.

M. Shop Coating -- Finish all structural steel members using one coat of manufacturer's standard shop coat, after cleaning of oil, dirt, loose scale and foreign matter.

N. Package building components for shipping by common carrier.

2.3 ROOF AND WALL PANEL COMPONENTS

A. Roof Panels -- Standing Seam Roof Panels; 24 inches wide net coverage, with 3 inches high major ribs formed at the panel side laps, formed for field seaming using electrically operated seaming machine.

1. Side Joints: Factory-applied sealant for field seaming.
2. Material: Galvalume steel.
3. Thickness: 24 gauge.
4. Side laps: Two factory-formed interlocking ribs, with one weather sealed joint, mechanically field-seamed into place to form a double-fold 360 degree seam.
5. Length: Continuous from eave to ridge up to 41 feet in length.
6. Endlaps, Where Required: 7 inches wide, located at a support member.
7. Finish: KXL pre-painted finish, standard color at canopy drive thru.
8. Panel-to-roof purlin structural attachments: SSR clips with movable tabs which interlock with seamed SSR panel ribs and provide for 1-1/2 inch of panel movement in either direction from center of clip to compensate for thermal effects.
9. The SSR Roof System shall be tested and certified to meet Underwriters Laboratory UL 90 wind uplift rating. The UL 90 is a requirement for this project.
10. Panels shall have been tested in accordance to ASTM E-1592.
11. Panel fastening to meet uplift requirements shall be based on tested fastener values with appropriate Safety Factors.
12. Purlin strength with the SSR roof panel shall be determined and tested in accordance with AISI procedures.

B. Ridge Assembly for High End of Slopes -- SSR Ridge; draw-formed aluminum seam caps factory-attached to SSR ridge panels that are mechanically field-seamed together along the center of the ridge, utilizing only one weather sealed joint and providing a true expansion joint for panel movement.

C. Wall Panels -- Panel Rib; 36 inch wide net coverage, with 1-3/16 inch high major ribs at 12 inches on center with minor ribs spaced between the major ribs.

1. Material: Galvanized steel, with G90/Z275 coating.
2. Thickness: 24 gauge.
3. Side laps: Two fully-overlapping major ribs secured together with 1/4 inch diameter color-matched carbon steel fasteners.
4. Length: Continuous from sill to eave up to 41 feet in length.

5. Endlaps, Where Required: 4 inches wide, located at a support member.
6. Cut panels square at each end; provide base trim at sill.
7. Finish: SP pre-painted finish.

D. Panel Fasteners:

1. For Galvalume and KXL finished roof panels: Stainless steel-capped carbon steel fasteners with integral sealing washer.
2. For wall panels: Coated carbon steel.
3. Color of exposed fastener heads to match the wall panel finish.
4. Concealed Fasteners: Self-drilling type, of size as required.
5. Provide fasteners in quantities and location as required by the manufacturer.

E. Flashing and Trim -- Match material and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.

F. Plastic Parts -- Glass fiber reinforced resin or thermoformed ABS (Acrylonitrile-Butidene-Styrene).

1. ABS: Minimum 1/8 inch thick.
2. Color: Manufacturer's standard color.

G. Sealant, Mastics and Closures -- Manufacturer's standard type.

1. Provide at roof panel endlaps, sidelaps, rake, eave, transitions and accessories as required to provide a weather resistant roof system; use tape mastic or gunnable sealant at sidelaps and endlaps.
2. Provide at wall panel rakes, eaves, transitions and accessories.
3. Closures: Formed to match panel profiles; closed cell elastic material, manufacturer's standard color.
4. Tape Mastic: Pre-formed butyl rubber-based, non-hardening, non-corrosive to metal; white or light gray.
5. Gunnable Sealant: Non-skinning synthetic elastomer based material; gray or bronze.

H. Blanket Insulation -- Glass fiber, with factory laminated facing material

1. Glass fiber: Odorless, neutral colored, long filament, flexible resilient, produced in compliance with the NAIMA 202 specifications.
2. Thermal Resistance: to meet R=11, in walls, and R-11, in roof @ 75 degrees F mean temperature.
3. Flame spread Index: 25 or less, when tested in accordance with UL 723.

4. Smoke Developed Index: 50 or less, when tested in accordance with UL 723.
5. UL Classified.
6. Facing: White vinyl; embossed, 0.0032 inch +/- 10%thick; permeance in compliance with ASTM E96 1.00 perm.Composite fiberglass and facing to meet Flame Spread of 25 or less, Smoke Developed of 50 or less, when tested in accordance with UL 723.

7. Provide facing 3 inches wider on both edges than blanket.
8. Width: As required for installation.
9. Use blanket insulation at walls.
10. Use blanket insulation at roof.

G. Thermal Blocks -- Superblock; 1 x 3-1/2 inch extruded polystyrene thermal spacer strips capped by 22 gauge galvanized channels, with swagged end for interconnection along the purlin run, metal tabs at 2 feet on center at SSR clip locations, and pre-punched fastener holes.

2.4 DOORS & FRAMES

A. Service Doors
1. Doors for Cylindrical Locks: SDI 100, Type 1, Style 2 (1-3/4 inches thick minimum 20 gauge steel face sheets).
2. Type: Full flush.
3. Frames: SDI 100, modified drywall type, 4-3/4 inches jamb depth minimum 16 gauge steel; self-framing and self-flashing.
4. Hardware Reinforcements: Comply with SDI 100; locate so that door and frame are non-handed.
5. Finish: Two coat baked on paint on all exposed surfaces, apply after cleaning and chemical treatment for corrosion resistance and paint adhesion; manufacturer's standard bronze color.
6. Weather stripping: At jambs, head and sill, complying with water and air resistance requirements of SDI 115 and SDI 116.
7. Hardware:
   a. One key in-knob cylindrical lockset per opening.
   b. Three full mortise hinges per leaf, one with non-removable pin.
7. Single Door Size: 3 by 7 feet.

C. Louvers -- 18 gauge galvanized steel, self-framing, self-flashing with integral head gutter, with paint finish.

1. Type: Fixed blade.
2. Screen: Exterior mounted, removable insect screen.
3. Minimum Free Area: 65 percent.
4. Size: 1.5 by 1.5 feet.
5. Color: Manufacturer's standard bronze.

D. Wall Openings -- Cold-formed sheet metal framing concealed with manufacturer's standard bronze trim.

2.5 ROOF ACCESSORIES

A. Eave Gutters -- Roll-formed 26 gauge steel sheet, with gutter straps, fasteners and joint sealant; manufacturer's standard bronze color.

1. Downspouts: 4 x 5 inches in 10 foot lengths, with downspout elbows and downspout straps; same color as wall panels.

PART 3 -- EXECUTION

3.1 EXAMINATION

A. Verify that foundations are installed correctly.

B. Verify that anchor bolts are installed as indicated on anchor bolt shop drawings.

3.2 ERECTION

A. Erect pre-engineered building in accordance manufacturer's instructions, erection drawings, and other erection documents.

B. Provide temporary bracing, shoring, blocking, bridging and securing of components as required during the erection process.

C. Clean all dirt, mud, stains, etc. from steel framing and vinyl backed insulation before installation.

END OF SECTION

SECTION 15411
WATER SERVICE

PART 1 - GENERAL

1.1 SCOPE

A. Provide complete exterior water system including all pipe and appurtenances 5'-0" outside of building or as shown on the plans, to complete tie-in with utility company.

B. Pay all cost required by utility company pertaining to construction and tie-in. Deposits required for permanent service shall be paid by the Owner.

C. Verify with local water utility company as to the meter size of sufficient capacity as indicated on the drawings, allowing the discharge flow pressure, as indicated on the drawings, for proper sanitary operation of all fixtures in the project, and fire protection if required.

D. The Contractor shall furnish meter, if utility company does not, without any additional cost to the Owner. Verify location of meter and install as per City standards.

E. Verify location of utility and determine soil conditions prior to bidding.

F. All piping from point of entry of fire system valve pit into building shall be in accordance with Section 15900 of this Specification and is not a part of this section of work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall conform to applicable ASA, AWWA, and/or ASTM Specifications.

B. Pipe 1-1/2" through 4: shall be PVC (Polyvinyl Chloride) Type 1, Grade 1, conforming to ASTM Resin Specifications D1784-60T, and shall be stamped with the NSF seal of approval. The pipe shall be suitable for a minimum 160 psi working pressure at 73NF and conform to the requirements of Specifications ASTM D241-64T, and CS256l-63 and with Standard Dimension Ratio SDR-26. Joints shall be push-on ring type.

C. Pipe larger than 4" shall be cement-lined ductile iron, complying with ANSI A21.6 or ANSI A21.8. Fittings shall comply with ANSI A21.10. Rubber gaskets shall comply with ASNI A21.11. Lining shall company with AWWA C104.

D. Valves shall be List 14 AWWS gate valves with operating nut. Provide cast iron box with stay-put cover marked "water". Valve connections shall match pipe. Direction of opening shall be the same as the standard of the utility supplying the water.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Section 15000, "Excavation, Trenching, and Backfill".

3.2 INSTALLATION

A. Piping shall have a minimum of 30" ground cover to final finished grade. Pipe under driveways shall be buried a minimum of 3'-0' and under railroad tracks a minimum of 4'-0".

B. Pipes shall be clean inside when put in trenches and open ends shall be plugged when work is stopped.

C. Plastic Pipe Assembled with Insert and Clamp Joint:

1. Follow manufacturer's latest written instructions and recommendations for assembly.
2. Follow manufacturer's latest written instructions and recommendations for trenching and backfilling.

D. Pipe Assemblied with Push-on Joints

1. Pipes shall bear throughout their length and not be supported by bell ends only.
2. If ground is soft, make provisions for supporting pipe.
3. Follow manufacturer's latest printed instructions for making joints.
4. All tees, plugs, cps, bends, and hydrants shall be anchored. Thrust blocks shall be used.

5. Thrust blocks shall be cast-in-place at each change in the direction of a pipe line and at all tees, plugs, caps, and bends. Use 2,000 pound concrete mix. Backing shall be placed between solid ground and the fitting to be anchored and shall be of such bearing areas as to assure adequate resistance to the thrust to be encountered. See NFPA Pamphlet No. 24 for the suggested bearing are sizes. In general,

backing shall be so placed that the joints will be accessible for inspection and repair.

6. Down steep hills, mains shall be properly blocked to prevent slipping.
7. Follow manufacturer's instructions for trenching and backfilling.

E. Valves shall be installed with cast iron valve boxes. Top of boxes, when not already in a paved area, shall be set with a 4" thick concrete pad, extending 6" beyond each side of box. Valves on pipe 3" size and over shall be anchored with concrete pad under and metal straps over to withstand thrust when valve is closed.

F. Service taps in pipe smaller than 3" shall be made with tee fittings. Taps in cast iron piping shall be no larger than allowed by ASA. Larger size connection shall be made with pipe saddles or tees. Plastic pipe 3" and larger may be tapped using tools and saddle assemblies intended for taping PVC plastic pipe.

3.3 STERILIZATION

A. Sterilization of water piping shall be in accordance with the latest local and State codes and AWWA C^01-68.

3.4 TESTING

A. Provide all necessary equipment and labor to perform a hydrostatic test of all work installed. A pressure of at least 150 psi shall be applied for not less than two (2) hours and all pipe, fittings, valves, and joints shall be carefully examined for defects. Leaky joints shall be made watertight.

B. Tests shall be approved by governing agency when applicable. Results of sid test, signed by the governing agency or the Contractor, shall be furnished to the Architect-Engineer.

END OF SECTION

SECTION 15421
SEWER SERVICE

PART 1 - GENERAL

1.1 SCOPE

A. Provide complete exterior sanitary sewer from each building drain a distance of 5'-0" from outside the building to complete tie-in with utility lines as indicated on the drawings.

B. Pay all cost required by utility company pertaining to construction and tie-in. Deposits required for permanent service shall be paid by the Owner.

C. Work under this Section shall comply with all requirements of the utility being tied into and local ordinances.

D. Verify location of utility and determine soil condition prior to bidding.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall conform to applicable ASTM specifications.

B. Pipe for gravity sewer shall be standard weight bell and spigot pattern vitreous clay pipe with rubber gasket joints, with fittings. Where required, other types of pipe will be specified on the drawings. At contractor's option, schedule 40 PVC-DWV pipe and fittings may be used when allowed by code.

C. Cleanouts to grade (COTG) shall be equal to Wade Model W-6030-Z, SV hub outlet, cast iron cleanout with threaded, adjustable housing, flanged ferrule with plug and round scoriated cast iron tractor top.

D. Job built manholes shall be as detailed on drawings, or as required by local utility.

E. Precast manholes approved by the utility being tied into may be used with prior approval from the Architect-Engineer. Submit shop drawings for approval.

F. Manhole rings and covers shall be equal to Midwest Casting Corporation No. 1124, unless otherwise specified on the drawings.

G. Manhole steps shall be equal to Midwest Casting Corporation No. 1490.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Refer to Section 15000, "Excavation, Trenching, and Backfill".

3.2 INSTALLATION

A. Pipe laying shall progress upgrade with pipe laid bell end upgrade. Test pipe for soundness and clear interior and joint surfaces before lowering into trench. Lay pipe in straight lines on uniform grade between points where changes in alignment or grade are indicated. Alignment and invert elevation for each pipe shall be check as it is laid, using batter boards in place at least 100'-0" ahead of construction, or by the use of laser beam. Any joint disturbed after being laid shall be rechecked. Pipe shall be fitted together to form smooth, uniform invert.

B. Any jointing material or foreign substance entering pipe, after it is lowered into trench, must be cleaned out before pipe laying progresses. A stopper shall be kept in end of pipe when pipe laying is not in progress.

C. Cleanouts to Grade:

1. Provide cleanouts at all changes of direction in gravity sewer line where manhole is not indicated.
2. Where cleanouts to grade do not fall in paving, provide a 4" concrete pad, extending 6" beyond each side to anchor top.
3. Cleanout box shall be independent of pipe to allow for settling.

D. Service connections shall be made in full accordance with requirements of the utility being tied into.

E. Manholes:

1. Manhole construction shall meet all requirements of the utility being tied into.
2. Invert channels shall be smooth, accurately shaped, and in accordance with requirements on the drawings.
3. Manholes shall be built-up so that the cover, when placed, will be at the finished grade, or as noted on the drawings.

3.3 FLUSHING AND TESTING

A. Gravity Sewers:

1. Upon completion, and before final acceptance of work, all sewers shall be flushed with sufficient water to obtain free flow through each line.
2. Upon completion of work, line shall be plugged at both ends and tested for infiltration. Infiltration shall not exceed fifteen (15) gallons per day per 100'-0" of pipe.
3. Any obstructions encountered are to be removed and defects discovered shall be corrected.
4. The Contractor shall, at the option of the Architect-Engineer, conduct additional tests if the tests are performed during, or following, prolonged dry weather.
5. Tests shall be approved by governing agency when applicable. Results of said test, signed by the governing agency or the Contractor, shall be furnished to the Architect-Engineer.

END OF SECTION

SECTION 15431
SITE DRAINAGE

PART 1 - GENERAL

1.1 SCOPE

A. Provide the following drainage systems as required:

1. Sub-drainage system, foundation and/or underslab.
2. Storm water system and structures which at 5'-0" outside of building walls. This includes catch basins, area drains, manholes, culverts, headwalls, etc.
3. Dewatering systems.

1.2 CODES AND REGULATORY AGENCIES

A. Comply with applicable requirements of National Plumbing code unless the work is governed by other more stringent codes. Where necessary to tear up existing public property, perform all repair work in accordance with requirements of governing authorities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Storm Drainage Pipe: Type and class as indicated on drawings, conforming to the following (see Pipe Schedule on drawings):

1. Vitrified Clay: ASTM C13 (standard), C200 (extra strength).
2. Non-reinforced Concrete Pipe: ASTM C76, Class 111 unless indicated otherwise.
3. Cast Iron: ASTM A74.
4. Drain Tile: ASTM C4.
5. Corrugated Metal Pipe or Pipe Arch: (ASTM A444) 16-gauge unless indicated otherwise on drawings, asphalt coated.
6. At contractor's option, schedule 40 PVC-DWV pipe and fittings may be used when allowed by code.

B. Joints: Use bituminous joint compound for clay and concrete pipe, standard connection bands for corrugated metal pipe.

C. Drainage Structures: As required by drawings with materials conforming to following:

1. Brick: ASTM C32, Grade MA.
2. Concrete: Comply with Section 03310.

3. Castings: Type shown on drawings, ASTM A48; Class 20; true in form and dimensions, free from defects affecting strength. Machine fit and mark bearing surfaces between frames and covers or grates to prevent rocking.
4. Mortar: One (1(part Portland Cement (ASTM C150, Type 11); two (2) parts sand (ASTM C144): 20% hydrated lime (ASTM C6).
5. Backfill Material: Conform to Section 02200, Earthwork.
6. Reinforcing Steel: Comply with Section 03310.

PART 3 - EXECUTION

3.1 PREPARATION FOR STORM WATER SYSTEM AND STRUCTURES

A. Excavation: Conform to requirements of Section 02200, Earthwork. Excavate whatever substances encountered to depth shown on the drawings.

1. Excavated materials not conforming to one of the soil types, as listed in Section 02200, Earthwork, Par. 2.1, A.1 or A.2, shall be removed from project site.
2. Excavated materials not required for fill or backfill shall be removed from project site.

B. Sides of Trenches: Excavate nearly vertical to depths and widths required for installation of work and tamping of backfill. Trenches shall be sheathed s necessary to prevent cave-ins and injury to work and workmen. (See Section 01500, Temporary Facilities and Controls.)

C. Bottom of Trenches: Shape accurately to exact grades so that pipe will have full bearing on undisturbed soil. Form bellholes by hand only after bottom of trench has been accurately graded and bells located. No blocking of pipe or conduit will be allowed. Remove and replace to a depth, determined by the Architect-Engineer, all unstable soil or rubble fill encountered at bottom of trench with thoroughly consolidated gravel or sand. Keep clear of water at all times. Bottom of trench shall be rounded so that an arc of circumference equal to 0.6 of outside diameter of pipe to assure stability during backfill.

3.2 PIPE INSTALLATION

A. Bedding for Pipe: Provide firm foundation, carefully shaped for pipe and bells, true to line and grade.

B. Clay and Concrete Pipe: Place hubs upgrade, closely jointed, with minimum slope of 1/8" per foot or as

indicated on the drawings. Clean out any excess joint compound that protrudes into pipe so that water will run freely.

C. Lay pipe with bell end upgrade, with alignment and invert checked during progress on installation.

3.3 DRAINAGE STRUCTURE INSTALLATION

A. Comply with applicable sections of these specifications for type of work involved.

3.4 BACKFILLING TRENCHES

A. Backfill trenches after piping has been installed, approved, and debris removed, placing in 4" layers, tamped under and around pipe to height of at least 1'-0" above pipe. Do not disturb underlying work. Backfill remainder of trenches and excavations in 6" layers and bring up to rough grade, with each layer compacted requirements of the soil type as listed in Section 02200, Earthwork, Par. 2.1, A.1 or .2. Remove sheathing and shoring as backfill is placed and fill space with dry sand.

3.5 BACKFILLING AT DRAINAGE STRUCTURES

A. Remove forms and debris from around manholes and other structures. Place backfill material symmetrically on all sides in 8" maximum layers. Moisten and compact each layer with mechanical or hand tampers to density requirements of the soil type as listed in Section 02200, Earthwork, Par. 2.1, A.1 or A.2.

3.6 TESTS

A. Upon completion of work, piping shall be plugged at both ends and tested for infiltration, which shall not exceed 0.6 gallon per inch of internal diameter per hour per 100'-0".

B. Test results shall be recorded for each section, or portion, of the system. Record shall indicate date(s) performed, weather conditions, times of days over which tests conducts, and shall be signed by the Contractor.

C. The Contractor shall, at the option of the Architect-Engineer, conduct additional tests if the tests are performed during, or following, prolonged dry

weather.

D. The Contractor shall furnish the Architect-Engineer two (2) copies of said test results.

END OF SECTION

SECTION 15440
PLUMBING SPECIALTIES

PART 1 - GENERAL

1.1 SCOPE

A. Furnish and install all equipment and specialties shown on the plans or specified herein.

B. Provide all necessary support, trim and accessories required.

1.2 All items furnished under this Section shall be submitted for approval.

PART 2 - PRODUCTS

2.1 CLEAN-OUTS:

A. Caulking plugs shall be Wade No. W-8550-R, Josam or Zurn casts iron cleanout for caulking into soil pipe hub with straight threaded, plated raised hex head plug having tapered shoulder that seats against lead seal.

B. Wall cleanouts for dry wall or block construction shall be Wade No. W-8450-R, Josam or Zurn cast iron caulking ferrule for soil pipe hub, plated cast iron raised head plug, tapped for machine screw, and stainless steel round access coverplate secured to plug by countersunk brass screw.

C. Wall cleanouts for plaster or tile wall construction shall be Wade No. 8450-C-130, Josam or Zurn casts iron caulking ferrule for soil pipe hub, plated cast iron raised head plug with lead seal, and cast nickel bronze round flush access cover with polished top, anchor lugs, and coverplate secured to plug by countersunk brass screws.

D. Floor cleanouts shall be Wade No. W-6030, Josam or Zurn adjustable cast iron floor cleanout, coated cast iron internal cleanout lug, polished Nickaloy rim and scoriated coverplate, secured to plug by countersunk screw. Provide recessed top where cleanout occurs in tile floor. Provide cleanout marker when cleanout occurs in carpet.

E. Cleanouts to grade shall be Wade No. W-6030-2, Josam or Zurn cast iron cleanout, plated cast iron countersunk plug, adjustable head and heavy-duty loose set scoriated tractor cover.

2.2 WATER HEATERS

A. Water heaters shall bear ASME symbol where required by code.

B. Provide T&P relief valve for each heater or storage tank, pipe to drain.

C. Heaters and storage tanks shall be complete with all necessary controls and insulation.

D. Provide water tempering valve, Watts and Holby valves are acceptable.

PART 3 - EXECUTION

3.1 All equipment subject to damage prior to completion of building shall be protected in an approved manner. Job must be turned over to Owner with all fixtures clean and free from damage.

3.2 All floor drains or clean outs shall be installed flush with finished floor.

END OF SECTION

SECTION 15450
PLUMBING FIXTURES

PART 1 - GENERAL

2 SCOPE

A. Furnish and install all fixtures shown on the plans or specified herein.

B. Provide all necessary support, trim and accessories required.

C. All items furnished under this Section shall be submitted for approval.

D. Fixtures shall meet all applicable code requirements.

PART 3 - PRODUCTS

4 FIXTURES

A. Fixtures shall be non-absorbent throughout and free from waves, kiln marks or discoloration.

B. All surfaces coming in contact with walls, floors or other flat surfaces shall be flat.

C. All enameled ironware shall be acid-resisting.

D. All fixtures shall be punched for trim specified.

E. Fixtures shall be equal to those scheduled on the Drawings.

5 TRIM

A. All exposed finished metal parts shall be chromium-plats; except, rough-bodied parts shall be nickel-plated.

B. All supplies shall be IPS brass; except, where otherwise specified.

C. All fixtures will be provided with some form of supply stop.

D. Traps for lavatories and sinks shall be chrome-plated cast brass P-traps with clean-out.

E. Provide cast brass, chrome-plated, set screw type, escutcheons on supply and waste piping.

F. Chair carriers shall be approved model of Wade, Zurn or J.R. Smith.

PART 6 - EXECUTION

A. All fixtures subject to damage prior to completion of building shall be protected in an approved manner. Job must be turned over to Owner with all fixtures clean and free from damage.

B. All wall hung plumbing fixtures with lip extending more than 15" from wall shall be supported on chair carriers.

C. Unless specifically specified to be furnished with chair carrier, wall hung lavatories, sinks, etc. shall be secured to wall with back-up plate and threaded rods. This Contractor shall furnish and install all backing, blocking, reinforcing, hangers, bolts, anchors and brackets required.

D. Fixtures mounted on uneven surfaces shall be bedded in an approved manner.

E. All hot and cold water supplies to plumbing fixtures shall have a drop-ear fitting secured to prevent movement.

END OF SECTION

SECTION 15600
HVAC EQUIPMENT

PART 1 - GENERAL

1.1 Provide all required equipment, appurtenances, and accessories for a complete heating and/or cooling system.

1.2 See other sections of these specifications that may specify accessories or features.

1.3 Refer to the schedules on the drawings where equipment capacities are not included in this section.

1.4 Review other sections of the specifications and the plans for services required to each piece of mechanical equipment. Any required accessories, appurtenances, or service omitted from the plans or specifications that is not called to the attention of the Architect-Engineer, at least seventy-two (72) hours before bidding and corrected by addendum, shall be provided as though shown.

1.5 Motors required in connection with equipment shall be of sufficient size and speed for duty to be performed, not exceeding their full rated load when driven equipment is operated at specified capacity under most severe conditions likely to be encountered.

1.6 Belt drives shall be adjustable "V" belt type. Selection shall be based on l50% of the motor horsepower. Selections shall be factory set so that specified capacity is at midpoint setting, allowing 20% overall speed adjustment. Motors shall be selected on ll0% of the brake horsepower required with a service factory of 1. Motors and/or drives shall be changed, if required, to deliver specified CFM should static pressure differ from that specified.

1.7 All exposed rotating machinery shall be equipped with guards.

1.8 Submit all equipment for approval.

1.9 All refrigeration compressors shall carry manufacturer's standard five (5) year warranty.

PART 2 - PRODUCTS

2.1 See plans for specifications and capacity of mechanical equipment.

2.2 SINGLE ZONE ROOFTOP UNITS

A. Units shall be factory assembled single piece, heating and cooling units as manufactured by York. Contained within the unit enclosure shall be all factory wiring, piping, controls, refrigerant charge (R-22), and special features

required to field start-up.

B. Units shall be rated in accordance with ARI Standards 210 and 270 and designed in accordance with UL Standard 465. Units shall be UL tested and certified in accordance with ANSI A21.47 Standards and CSA and CGA certified as a total package.

C. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a prepainted baked enamel finish. Indoor blower compartment interior cabinet surfaces shall be insulated with a minimum 1/2" thick, flexible glass fiber insulation, coated on the air side. Aluminum foil faced glass fiber insulation shall be used in the furnace compartment.

D. Indoor blower (evaporator fan) shall be belt driven as shown on the equipment drawings. Belt drive shall include an adjustable pitch motor pulley. Fan wheel shall be double inlet type with forward curved blades. Bearings shall be sealed, permanently lubricated, ball bearings type. Indoor blower shall be made from steel with a corrosion resistant finish and shall be dynamically balanced. NOTE: AC-4 Lennox GCS16-653125 indoor blower will be direct drive.

E. Outdoor (condenser) fan shall be of the direct driven propeller type and shall discharge air vertically up-ward. Outdoor fan shall have aluminum blades riveted to corrosion-resistant steel spiders and dynamically balanced.

F. Induced draft blower shall be of the direct driven single inlet forward curved centrifugal type, made from steel with a corrosion resistant finish and dynamically balanced.

G. Compressors shall be fully hermetic type and shall be factory rubber shock mounted and internally spring mounted for vibration isolation. Units shall be equipped with a factory installed crankcase heater to minimize liquid refrigerant accumulation in compressor during shutdown and prevent refrigerant dilution of oil.

H. Evaporator and condenser coils shall have aluminum plate fins mechanically bonded to seamless copper tubes with all joints brazed. Tube sheet openings shall be belled to prevent tube wear. Evaporator coil shall be of the full face active design.

I. Heating section shall be induced draft combustion type with energy savings direct spark ignition system and redundant main gas valve. The heat exchanger shall be of

the tubular section type construction of a minimum of 20 gauge steel coated with a nominal 1.2 mil aluminum silicone alloy for corrosion resistance. Burners shall be of the in-shot type constructed of aluminum coated steel. All gas piping shall enter the unit cabinet at a single location.

J. Refrigerant circuit components shall include filter, drier, liquid line sight glass, thermal expansion valves and service gauge connections on suction, discharge and liquid lines.

K. Standard filter section shall consist of factory installed low velocity, disposable 2-inch thick glass fiber filters of commercially available sizes. Filter face velocity shall not exceed 320 FPM at nominal airflows.

L. Compressors shall be provided with the following minimum protection:

1. Compressor overtemperature, overcurrent
2. Low pressure switch
3. Freezestat, evaporator coil
4. High pressure switch

M. Compressor motors shall be cooled by suction gas passing through motor windings and shall have line break thermal and current overload protection.

M. Heating section shall be provided with the following minimum protections:

1. High temperature limit switch
2. Induced draft motor centrifugal switch
3. Flame roll-out switch (manual reset)
4. Flame proving controls

O. Units shall be capable of starting and running at 115 degrees F ambient outdoor temperature per maximum load criteria of ARI Standard 210. Compressor with standard controls shall be capable of operation down to 35 degrees F ambient outdoor temperature. Where indicated on plans, units shall be capable of operating down to 0 degrees F ambient outdoor temperature.

P. Roof curbs shall be formed 16 gauge galvanized steel with wood nailer strip and capable of supporting entire unit weight.

Q. All units shall be equipped with two-position damper package consisting of damper, birdscreen and rainhood which can be preset to admit up to 50% outdoor air for

year-round ventilation. Ventilation CFM shall be set as scheduled on plans.

R. Carrier has internal condensate trap. Lennox equipment to be provided with premolded condensate trap.

2.3 MAKE-UP AIR UNIT

A. Provide direct fired make-up air/heating unit is as manufactured by National Air Systems, Inc. or approved equal. The unit shall be designed to meet the standards for direct-fired gas heating equipment as developed by the American National Standards Institute (ANSI Z83.4). Units are ETL listed to ANSI Standards.

B. The unit shall be shipped in one (l) piece from the factory completely wired and piped, with the exception of remote control devices, O/A weatherhoods, filter cabinets and roof curbs. Removable lifting lugs are to be provided from the factory for rigging the unit.

C. The cabinet shall be of double-wall construction with l-l/2" inch, l-pound density insulation. The construction material used shall be aluminized steel for highcorrosion resistance. The unit shall be fully weatherized for outdoor mounting. All gas and electrical controls shall be mounted in fully weatherized control compartments with easy removable doors.

D. The unit shall be provided with a weatherized fused disconnect switch, for 200/208V-3 phase, 60-cycle, supply voltage. A ll5-volt and a 24-volt transformer shall be provided for gas, safety and electrical controls. All remote wiring and controls shall be 24-volt. A motor with adjustable drive shall be included. Motors shall be provided with a motor starter with 3-leg protection.

E. Gas safety controls shall be provided to meet owner's insurance company requirements (ISO) and will include flame safeguard relay with ultraviolet flame sensing. Automatic and manual high temperature limits are to be provided at the discharge of the unit and a high temperature safety located at the burner. An adjustable outside air cut-off shall be provided to shut off gas when outside air temperatures exceed 65 degrees F.

F. The unit shall be provided with l00% outside air, constant volume. The velocity of air over the burner must always remain constant and at no time shall re-circulated air pass over the burner. High and low air velocity safety pressure switches shall be provided to protect against low or high air flow over the burner.

G. The gas temperature controls shall be electronic with

accuracy to 0.2 degrees F. The nominal turndown ratio be 25:1 with total control between high and low fire. The unit shall be provided with pre-purge time delay and arranged for positive low fire start-up. The temperature controls shall be discharged air control from 50 degrees F to 90 degrees F. The system shall be resettable from a remote temperature selector mounted on the remote control console.

H. The unit shall include burner, blower and damper service switches in the electrical compartment to provide manual operation of the unit. A remote operating sensor shall be provided with a system switch, burner and blower lights.

I. Provide the following accessories:

1. Outside air weatherhood with 2" T.A. filters
2. Roof curb

2.4 POWER ROOF VENTILATORS

A. Ventilators shall be manufacturer's standard, AMCA certified and direct drive or belt drive as indicated on the plans. Fans shall be the centrifugal type with fan blades of an air foil design, with a fabricated housing of spun aluminum, birdscreen and disconnect switch. Accessories shall be as scheduled on the plans. Motors shall be mounted outside the airstream, and so arranged that the motor will be continuously cooled by outside air.

B. Fans shall have capacities as scheduled on the plans and shall be ACME, Jenn-Aire or approved equal.

2.5 DISHWASHER EXHAUST FAN

A. Fan shall be a special heat and fume resistant roof ventilator, AMCA certified. Housing shall be all aluminum. Fan shall be backward inclined, centrifugal type with vertical discharge, birdscreens and disconnect switch. Removable grease troughs shall be provided. Fan shall be ACME, Jenn-Aire or approved equal.

2.6 KITCHEN HOOD FANS (GREASE REMOVAL)

A. Fans shall be special grease removal design and AMCA certified. Housing shall be all steel painted with UL approved glass paint. Fans shall be backward inclined, centrifugal type with upblast discharge and disconnect switch. Blower unit shall be base mounted and hinged so that the unit may be tilted upward for cleaning of exhaust duct system. Fan shall be Supreme 213-344-4384, no substitutes.

2.7 KITCHEN EXHAUST HOODS

A. Kitchen hoods are manufactured by National Air Systems, Inc. installed by Heating, Ventilating, Air Conditioning. Coordinate the following items:

1. Ventilator shall be constructed per NFPA Phamplet No. 96 of 18 gauge stainless steel.

2. Hoods shall be UL listed without fire dampers in exhaust outlet, UL classified stainless steel grease filters which shall be easily removable without the use of tools. All exhaust plenum surfaces and filters shall drain into a full length grease trough that drains into a recessed, removable grease container. Exposed seams shall be welded and ground. Hood construction shall conform with NFPA Standard 96 and the National Sanitation Foundation.

3. The four (4) hoods are provided with an automatic fire protection system, which shall conform with the National Fire Protection Associates, Standard No. 96 and all local or State codes. The system shall be the wet chemical, pre-engineered fixed nozzle type with UL listing for the hazard. The design of the system shall provide for protection of the duct systems, grease removal devices and hoods. Cooking equipment which may be a source of ignition of grease shall also be protected. All sources of fuel to gas equipment and electric fryers shall be automatically shut off upon operation of the system. The system shall be piped in hood with all branch piping concealed. Storage bottles shall be installed in a self-contained cabinet. A manual activation device shall be provided in accordance with local code requirements.

4. The hoods shall be provided with UL approved light fixtures. Light fixtures shall be factory pre-wired to a junction box, which is to be mounted on top of the canopy. The lights shall be factory wired to a switch located on the face of hoods.

5. The fans shall be field wired by Division 16, Electrical wiring controls located on end of Hood Number four. Controls furnished by Division 15.

6. The electrical shunt trip and gas valve shall also be activated by a manual pull-station. Provide a manual reset relay for the gas valve. The switch is provided by hood manufacturer. Wiring provided by Division 16, Electrical.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE

A. All low pressure ductwork including supply, return, exhaust and outside air to complete the systems as shown on the drawings or specified herein.
B. Kitchen hood duct.

1.2 SUBMITTALS

A. Submit the following:

1. Air distribution devices
2. Flexible duct

B. Submit the following if not as specified:

1. Flexible connections
2. Damper hardware
3. Access doors

1.3 GOVERNING PUBLICATIONS AND AUTHORITIES

A. ASHRAE "Handbook"
B. SMACNA "HVAC Duct Construction Standards"
C. Underwriters Laboratories, Inc.
D. NFPA Pamphlets No. 90A and 96

PART 2 - PRODUCTS

2.1 DUCT MATERIALS

A. Galvanized steel sheets shall be lock-forming quality (LFQ) and shall have a galvanized coating of 1-1/4 oz. total for both sides of one square foot.

B. Stainless steel shall be mill finished in concealed spaces and polished finish in exposed locations. Provide 18 gauge for hoods and 16 gauge for dishwasher.

C. Black steel sheets shall be lock-forming quality (LFQ) either hot or cold rolled.

D. Duct Board is not acceptable.

2.2 FLEXIBLE CONNECTIONS

A. Flexible connections in ordinary venting, air conditioning, and hot water or steam heating shall be made from "Ventfab", fire, water and weather-resistant fabric.

B. Connections in high pressure systems, direct-fired heating installations, fume hoods and for those exposed to

the weather shall be made from "Ventglas", Neoprene coated glass fabric.

2.3 DAMPER HARDWARE

A. Dampers on exposed duct with shaft length or l2" or less shall be equipped with "Ventlock" #6520 l/4" dial regulator; with shaft length of l2" to 20" with "Ventlock" #635 3/8" dial regulators and #607 end bearings.

B. Larger dampers shall be controlled with "Ventlock" Self-locking Regulators #640 or #64l in 3/8" or l/2" size and shall be installed with #607 end bearings.

C. Damper operators on finished ceilings shall be equipped with "Ventlock" #666 concealed damper regulators (or #677 damper regulators). Where ceiling regulators must be flush mounted, "Ventlock" #688 exposed damper regulators shall be used.

2.4 ACCESS DOORS

A. Access doors to l6"x24" size shall be "Ventlock" stamped insulated access doors.

B. Larger access doors shall be double panel construction with l" rigid insulation between panels. Doors with largest dimension over 24"; but, less than 48", shall use "Ventlock" Series 200 latches, hinges and gasketing and construction shall be 22 gauge galvanized steel. Doors with largest dimension over 48" shall use "Ventlock" Series 300 latches, hinges and gasketing and construction shall be 20-gauge galvanized steel.

2.5 FLEXIBLE DUCT

A. Furnish and install, where indicated on the drawings, acoustical flexible insulated round ductwork, factory fabricated, listed under UL l8l Class I and NFPA 90A, capable of a minimum centerline bend radius equal to duct inside diameter. Insulation shall be l" thick, 3/4 pound. Density fiberglass blanket, maximum "K" value of 0.25 BUT inch/hour ft. 2 degrees F and vapor barrier shall be durable, scruff-resistant polyethylene jacket. Flexible duct shall be equal to Genflex, Type IL-25.

B. Final connections from ducts to ceiling diffusers may be made using flexible insulated duct, with lengths not to exceed 6 feet.

2.6 AIR DISTRIBUTION DEVICES

A. General:

1. All outlet grilles shall have gaskets.

2. Unless otherwise noted, sidewall devices and door grilles shall be grey baked enamel; ceiling devices shall be off-white baked enamel.

3. Diffusers and grilles shall be manufactured of extruded aluminum from 6063 aluminum alloy, with variable pattern. Diffusers and grilles will be equal to Air Guide Corporation Model JSPLT. All grilles and diffusers in drywall ceiling to have opposed blade dampers.

4. Where device is to lay in a tee bar ceiling, verify grid dimension. Device shall be square with nominal dimension of side same as shorter grid dimension. That is, provide 24x24 nominal panel with 24x48 grid, etc.

B. Devices:
Devices shall be as scheduled on the drawings.

2.7 DUCT LINER

A. Liner shall be Owens-Corning Fiberglass Aeroflex Type 300, 1" thick.

2.8 FLUES

A. Flues for gas-fired appliances shall be UL approved Type "B" vent. Furnished and installed by Plumbing Contractor.

2.9 LOUVERS

A. Louvers shall be Airline, American Warming and Ventilating or Ruskin, 6" deep, extruded aluminum, drainable blade type with 1/2" birdscreen. Finish shall be epoxy in standard color as selected by Architect-Engineer.

PART 3 - EXECUTION

3.1 GENERAL

A. All ductwork not specifically indicated on drawings or specified elsewhere to be medium or high pressure duct shall be fabricated, braced and erected in accordance

with SMACNA "HVAC Duct Construction Standards" or the latest edition of ASHRAE "Handbook". All ductwork shall be constructed to 2" w.g. pressure class.

B. Duct sizes shown are metal sizes and include allowances for duct liner.

C. Comply with SMACNA "Duct Liner Application Standards".

D. Adhere liner to all interior sides of duct with minimum 50% coverage of fire-retardant adhesive such as Foster 81-99 or Minnesota Mining EC-1329. Use mechanical fastening of Graham welded pins, Tuff-Weld nylon sections when width exceed 12" and on sides where height exceeds 24".

3.2 FLEXIBLE CONNECTIONS

A. Furnish and install sound isolating flexible connections on the inlet and outlet of each fan and unit to which duct connectors are made.

B. At least 1" thick shall be allowed in these connections to insure that no vibration is transmitted from fan to ductwork.

C. The fabric shall either be folded in with the metal or attached with metal collar frames at each end to prevent air leakage.

3.3 KITCHEN HOOD DUCT

A. Exhaust ducts for hoods shall be constructed of minimum 16 gauge black iron, or galvanized steel, or minimum 18 gauge stainless steel where indicated.

B. Use no vibration isolation connectors.

C. All seams and joints shall have a liquid-tight continuous external welds. All exposed welds shall be ground smooth.

D. Exhaust duct and enclosure, construction shall comply with NFPA 96. (By General Contractor).

3.4 DISHWASHER HOOD EXHAUST DUCT

A. Exhaust duct from dishwasher hood shall be liquid-tight manufactured of aluminum or stainless steel. Duct shall be sloped back toward exhaust hood. All exposed welds shall be ground smooth.

3.5 SMOKE AND FIRE PROTECTION

A. Smoke detectors located in the return air ductwork of rooftop AC units and the supply air ductwork of the heated make-up air unit shall shut down the respective system. Remote panel will provide manual reset and l test. Remote panel will include test and reset for each detector. Panel will indicate AC-l, 2, 3, & 4 and MUA-l.

B. Smoke detectors shall be provided and installed under Division l5 by Division l6 Electrical.

END OF SECTION

SECTION 16010
GENERAL PROVISIONS
ELECTRICAL

PART 1 - GENERAL

1.1 REFERENCE

A. This section is part of Division 1 – Volume 1 – General Provisions.

1.2 SHOP DRAWINGS

B. Shop drawings required on all major equipment items or when requested by Engineer.

C. General required shop drawings:

1. Lighting Fixture
2. Main Service Equipment
3. Panelboards
4. Starters
5. Raceway Systems
6. Wiring Devices
7. Special Systems: security, sound, signaling, dimming, etc.

D. Timing:

1. Shall occur as soon as practical after award of contract.
2. Engineer requires minimum of seven working days for review.
3. Special processing to meet project conditions shall be noted.
4. Shop drawing approval must be achieved before fabrication of equipment starts.

E. Contractor’s responsibilities:

1. Review all shop drawings prior to submittal to Engineer.
2. Submit sufficient number to provide 2 sets for Owner, 1 set for Architect and 1 set for Engineer. Contractor to bind Owner’s sets along with maintenance/operating instructions and deliver to Engineer at project’s completion.
3. Identify project’s name, project’s contractor and specification section for each shop drawing.
4. Sign and date each shop drawing submitted.

    a. Signature to represent the Contractor’s review of shop drawings such that they comply with the Contract Documents.
    b. Shop drawings without Contractor’s signature will be returned unchecked.

1.1 COORDINATION

A. Coordinate work with other contractors such that interference with other trades or project delays do not occur.

B. Verify mounting heights and exact location of all devices and equipment with Architect. Any conflicts with other contractor's work shall be brought to the Engineer's attention prior to installation.

C. Ceiling space and shafts require close coordination; therefore, the following procedure shall be followed:

1. HVAC/sheet metal contractor shall initiate process by showing all ductwork on a reproducible drawing which has a scale not less than ½"=1'-0" for sections and ¼"=1/-0" for plans.
2. The drawing will be forwarded to the Electrical and Piping Contractors respectively for inclusion of their work.
3. Contractors to solve all coordination conflicts between themselves when possible. The Engineer will arbitrate when necessary and his judgement will stand without cost to the project.
4. Where obvious lack of interference occurs, the Contractor(s) need only sign off that their work will not cause interference, and therefore, will not be required to produce a drawing.
5. Contractor shall verify equipment furnished will fit in available space. Conflicts to be brought to Engineer's attention prior to ordering equipment.

1.2 DIMENSIONS

A. Drawings are diagrammatic and equipment, outlets, etc. locations are approximate.

B. Do not scale drawings.

C. Exact floor box locations shall be reviewed with the Architect.

1.3 CLEANING UP

A. Contractor shall keep the premises free from accumulation of waste material or debris caused by his work.

B. Waste materials or debris shall be removed from site by Contractor.

C. Where disputes occur, the Owner shall remove the waste materials or debris at the Contractor's expense.

1.4 CHIPS AND SCRATCHES

A. Contractor shall touch-up all equipment with chip or scratch marks.

1.5 CONTRACTOR'S QUALIFICATION

A. Contractor shall be a licensed electrician in the State and City.

1.6 GUARANTEE

A. All work and equipment furnished shall be guaranteed for one year or as specified in Architectural General Provisions except as otherwise indicated for a particular system or product.

B. Contractor to pay for all work and equipment which is defective during the guarantee period.

1.7 STATE SALES TAX

A. The Contractor shall include all State Sales Taxes.

B. Sales tax records shall be furnished to Engineer upon request.

1.8 RECORD DOCUMENTS

A. The Contractor shall maintain a complete set of reproducible drawings showing all modifications to the Contract Documents.

B. The record documents shall be forwarded to the Engineer at the project's completion for review and approval.

1.9 DISCREPANCIES

A. Where discrepancies exist in the Contract Documents, the Contractor shall bring it to the Engineer's attention.

B. If due to bidding conditions, the discrepancy cannot be resolved fairly between the bidding contractors, the item or arrangement of greatest cost shall be bid.

1.10 APPROVAL OF MATERIALS AND EQUIPMENT
(NOTE: Supercedes requirements of Division 1 – general Requirements.)

A. Substitutions of material and equipment to other than that which is specified in the Contract Documents must conform to all of the following:

1. Substitution request only through a Bidding Contractor.
2. Substitution received seven working days prior to bid date.
3. Substitution has adequate information to make a good engineering judgement.
4. Substitution can be bid by all bidding Contractors.

B. The Contractor shall submit a material and equipment list with manufacturers proposed to be used.

1. Material List to be submitted to Engineer five working days after award of contract for approval.
2. Manufactures not specified or not given prior approval will not be considered.
3. Material List shall be submitted on form provided at the end of this section.

1.11 MANUALS OF INSTRUCTIONS

Supplements requirements of Division 1 – General Provisions.

A. At the completion of the contract, this Contractor shall submit to the Engineer two (2) sets of operating and maintenance manuals and parts lists bound into hard covered manuals for all electrical equipment items. Manuals shall be labeled with the local supplier's name and address. All information not definitely applying to these particular pieces of equipment shall be crossed out or deleted from the submissions.

1.12 INSTRUCTION OF OWNERS EMPLOYEES

A. The Contractor shall furnish without expense to the Owner the services of competent instructors, who will give full instructions in the care, adjustment and operation of all parts of the electrical system and equipment to the Owner's employees who are to have charge of the equipment.

B. Each instructor shall be thoroughly familiar with all parts of the installation on which he is to give instructions and shall have full knowledge of the operating theory and practical operation-maintenance work. Factory trained instructors shall be employed wherever they are available.

B. Instructions shall be given during the regular work week after the building has been accepted and turned over to the Owner for regular operation. One man-day (8 hours) instructions will be furnished.

1.13 COST BREAKDOWN

A. The Contractor shall submit a detailed cost breakdown for the purposes of determining payments during construction.

B. Breakdown shall be submitted ten working days after award of contract.

C. Cost breakdown shall have material and labor separated.

D. Cost breakdown shall be submitted on form provided at the end of this section.

1.14 TEMPORARY OFFICE

A. Provide a temporary office, shop and storage space as required for the project's operation.

B. Space shall not constitute a fire hazard.

C. Space shall be located by Architect.

1.15 TEMPORARY LIGHT AND POWER

A. General

1. Provide temporary light and power for use of all trades.
2. Energy costs paid by General Contractor.
3. Install or remove system as soon as project dictates.
4. Lighting shall be based on a watt density of .5 watts per square foot.

B. Products

1. Materials used need not be new but electrically and mechanically safe.
2. Materials shall remain the property of the Contractor.
3. All products shall remain the property of the Contractor.
4. Lighting units to have basket protective lamp.
5. Circuits for receptacles shall have ground fault circuit interrupter.
6. Site fence lighting shall be weathertight units mounted on fence.
7. Temporary equipment exposed to weather must be suited for its purpose.

C. Execution

1. Main service shall be sized as required to suit temporary loads of project.
2. Provide distribution to loads such as panels,

temporary heating, cranes, hoistways, elevators, welders, etc.

3. Provide metering as required by local utility.
4. Extend lighting and power to all areas of the project as required.
5. Maintain temporary lighting and power system.
6. Provide and maintain all lamps.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

1.12 MATERIAL LIST

NAME OF PROJECT _____

LOCATION _____

ARCHITECT _____

ENGINEER _____

CONTRACTOR _____

DATE _____

ITEM	MANUFACTURER
1.	Main Service Equipment
2.	Panelboards
3.	Starters
4.	Fuses
5.	Conduit
6.	Conductors
7.	Wiring Devices
8.	Lighting Fixtures
9.	Lighting Control
10.	Fire Alarm
11.	Sound System
12.	Clock System

1.13 COST BREAKDOWN

NAME OF PROJECT _____

LOCATION _____

ARCHITECT _____

ENGINEER _____

CONTRACTOR _____

DATE _____

ITEM	LABOR	MATERIAL	TOTAL
1. GENERAL CONDITION COSTS			
Permits, Fees, Bonds, Insurance, Etc.			
Temporary Power and Light			
2. INCOMING SERVICE			
Power Company's Requirements, Including Fees			
Feeders to Main Switch			
3. MAIN SERVICE			
Main Switchboard(s), Metering, Disconnects			
4. EMERGENCY SERVICE			
Feeders, Batteries			
5. POWER DISTRIBUTION			
Panelboards, Transformers, Feeders			
6. FUSES			
All Fuses, Fuse Cabinets			
7. GROUNDING			
Counterpoise, Wiring			
8. MOTOR & EQUIPMENT REQUIREMENTS			
MCC, Starters, Disconnects, Control, Feeders, Branch Circuits.			
9. DEVICE & MISCELLANEOUS POWER REQUIREMENTS			
Device, Cover Plates, Outlet Box, Branch Circuiting			
10. LIGHTING INTERIOR			
Fixtures, Branch Circuits, Switches, Lamps			

11. LIGHTING EXTERIOR

Fixtures, Branch Circuits, Switches, Lamps, Poles

12. LIGHTING CONTROL

Time Clock, Low Voltage Switching, Dimming

13. TELEPHONE SYSTEM

Conduit, Sleeves, Terminal Cabinets, Etc.

14. FIRE ALARM (COMPLETE)

Conduit, Wire, Devices, Control, Etc.

15. SOUND SYSTEM (COMPLETE)

Conduit, Wire, Devices, Speakers, Control, Etc.

END OF SECTION

SECTION 16050
BASIC MATERIALS AND
METHODS

PART 1 - GENERAL

1.1 MATERIALS

A. All materials shall be new, as specified or approved, and in original packaging.

B. Contractor shall schedule delivery and provide for receipt, handling, storage and protection of material.

C. Contractor shall replace any material which is damaged due to delivery, handling, storage or lack of protection.

D. Catalog numbers specified shall be verified with vendors prior to ordering material.

E. All materials shall be UL labeled unless special fabrication of material is required.

F. Special fabricated material shall be fabricated using UL labeled components and procedures.

G. Material provided shall be in accordance with local union requirements.

H. Where the word "provide" is used, it shall require the contractor to furnish and install material complete to a workable system.

I. The equipment listed in the following Specification Sections, when furnished by the Contractor, shall all be of the same manufacturer.

16133: Cabinets
16155: Motor Starters
16163: Distribution Boards
16164: Branch Circuit Panelboards
16170: Disconnect Switches
16400: Secondary Service and Distribution
16460: Transformers, Any Type
16921: Mechanical Equipment Wiring

1.2 WORKMANSHIP

A. Provide for all labor and materials necessary for complete installation of wiring system for lighting and power.

B. All work shall be installed complete and left in operating condition.

C. Provide minor items which are necessary to complete work and even though they are not specified, such items as

bolts, nuts, washers, anchors, brackets, sleeves, etc.

D. Installation of equipment shall conform to applicable N.E.C.A. published standards.

1.3 CODES AND FEES

A. Work and materials shall be in full accordance with the following current codes:

1. National Electrical Code
2. State and Local Electrical Installation Codes
3. State and Local Building Codes
4. Uniform Building Code
5. State and Local Fire Codes
6. State Board of Health
7. Occupational Safety and Health Act
8. State Industrial Commission

B. Provide all necessary permits and licenses. Procure certificates as required for work installed.

C. Provide for inspections by regulating agencies.

D. Submit final inspection certificate signed by the local Electrical Inspector to Engineer at project's completion.

1.4 TESTS

A. All work shall be tested in accordance with industry accepted standards.

B. Before testing, a thorough visual inspection shall be made to detect connection problems, damaged components, poor workmanship, inappropriate overcurrent protection, debris, etc.

C. Testing apparatus shall be certified or demonstrated to be accurate within reasonable limits.

D. Competent personnel familiar with the test equipment shall perform all tests.

E. If testing procedures employed are not satisfactory to the Engineer, outside testing will be done at the Contractor's expense.

F. Document the test results and provide the Engineer with the following:

1. Date of Test
2. Test Type

3. Test Instruments Used
4. Readings
5. Failures, If Any
6. Corrective Measures Taken

G. Tests Required (As Applicable)

1. Feeders - Insulation resistance tests, phase to ground, phase to phase, with megger applying a test potential of at least 500 Volts D.C.
2. Circuit Breakers - Factory tests for calibration and UL requirements.
3. Main Building Ground(s) - Resistance-to-ground test with Null Balance Earth Tester.
4. Systems - Factory representative's letter certifying proper operation of systems as per Contract Documents.
5. Lighting Control - Same as "Systems" test.
6. Distribution Equipment Such as Transformers, Switchboards, Panelboards, Motor Control Centers, Etc. - Test for electrical continuity, phasing and safe operation prior to energizing.

1.5 WORK PROGRESS

A. Contractor to provide tools, material, manpower and equipment to keep progress with the project.

B. Problems shall be brought to the Engineer's attention immediately.

1.6 PEOPLE PROTECTION

A. Contractor shall be legally responsible for all means and methods used throughout construction.

B. Contractor shall install guards and barriers at electrical equipment to limit the approach of unauthorized personnel.

C. No work shall be done on energized equipment.

D. Contractor shall provide protective padding for any equipment mounted less than 6'-0" in walking areas.

1.7 EQUIPMENT FOUNDATIONS

A. Provide 2" high minimum concrete bases on all floor mounted electrical equipment.

B. Base shall be sized such that minimal overlap of base occurs.

C. Reinforce base as required to suit load.

1.8 SLEEVES, OPENINGS, CUTTING, PATCHING AND DRILLING

A. Contractor is responsible for all openings, cutting, patching and drilling.

B. Sleeve openings shall be with rigid pipe and set 1" minimum above finish floor.

C. Penetrations through existing structural floors and walls shall be made with core drill.

D. Exact locations of penetrations shall be verified with structural engineer such that structural integrity is maintained.

E. X-Ray shall be required on all post tensioned slabs.

F. Cutting and patching in finished spaces shall be such that the surface is restored to original condition.

1.9 FIRE STOPPING

A. Seal all penetrations and sleeves through fire rated walls and floors with Chase Technology CTC PR-855 fire stop, 3M Brand Fire Barrier Penetration System, or Nelson Flameseal System.

1.10 MOUNTING HEIGHT OF DEVICES

A. Unless otherwise shown or noted, position devices in structural course work such that a minimum of course work is cut.

1.11 HANGERS AND SUPPORTS

A. Provide all hangers and supports such that they are suitable in strength and anchorage to load imposed.

B. Anchorage shall be by cast-in-place concrete type equal to UNISTRUT where possible.

1. Expanding type masonry anchors are acceptable when cast-in-place cannot be used.
2. Other anchor methods must be approved by Engineer.

C. Conduit banks shall be supported as follows:

1. Structural channel as appropriate for load equal to UNISTRUT.
2. 3/8" minimum rod support.

3. 1" conduit and smaller - supports shall occur 7'-0" on center.
4. Conduit over 1" - supports shall occur 10'-0" on center.
5. All conduit to be strapped to channel.

D. In all areas where supports and hangers are subjected to vibration, spring type lock washers shall be used.
E. Individual conduit runs shall be supported by steel fasteners, such as caddy clips, suspended ring hangers or from ceiling tile support wires as application dictates.
F. Maximum conduit quantity and size suspended from ceiling tile support wires shall be one 3/4".
G. Twisted bailing wire will not be acceptable.
H. Support for panelboards, terminal cabinets, transformers and other similar equipment shall be made by providing adequate interior wall studs or exterior structural channel equal to UNISTRUT.
I. Lighting fixtures, conduits and other electrical equipment shall not be supported from ductwork.

1.12 IDENTIFICATION OF ELECTRICAL ITEMS

A. Contractor to identify all electrical equipment with stencilled 1/4" white letters on black micarta plates as follows:

1. Main service equipment
2. Panelboards (in finished areas, plate shall be behind door).
3. Disconnects, power distribution pull boxes, terminal cabinets, systems control cabinets, motor switches and starters.
4. Any equipment which falls under the general intent of this section.

B. In finished spaces, where specified, lighting switches, receptacles, motor controls, etc. shall be identified by their plates being engraved with 1/8" letters and filled with black paint.

C. All conduit shall be color coded by colored bands 2" wide applied at panel and junction box locations within each room and 50' on centers within an area.

1. Color Banding as follows:

a. 120/208 Volt - Gray
b. 277/480 Volt - Sand
c. Fire Alarm - Red
d. Telephone - Blue
e. Sound - Yellow
f. Security - Green

g. Clocks - Purple
h. Low Voltage Switching - Black
i. Other Colors as Need Dictates

D. All low voltage cables shall be bundled and labeled as to their function within terminal cabinets, wireways and cable trays.

E. All terminals in terminal cabinets shall be labeled as to their function by typewritten terminal directories.

F. Provide typed electrical, communication and special system cabinet directories on the inside covers.

1.13 BRANCH CIRCUIT NUMBERS

A. Branch circuitry shall match circuit numbers as shown on the drawings and as scheduled. Any required deviation shall be indicated on the as-built drawings.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 16110
WIREWAY

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Wireway

B. Raintight Wireway

1.2 RELATED WORK

A. Section 16010, Coordination

PART 2 - PRODUCTS

2.1 MATERIALS

A. Construction shall be as per Underwriter's Laboratories Standard UL 870 for wireways, auxiliary gutters and associated fittings.

B. Wireway

1. Painted steel enclosed wireway with hinged removable cover which can be used as either hinge cover or set screw cover.
2. Shall be fabricated such that the entire length of wireway and fittings permit lay-in wiring application.
3. Cross sectional area shall be 6" x 6" unless otherwise noted.
4. Maintenance of electrical and mechanical continuity of wireway sections shall be by threaded screws at each fitting.
5. Complete product line shall be used for fittings, hangers, offsets, couplings, etc.
6. Side knockouts shall be provided.
7. Provide closure ends.

C. Raintight Wireway

1. Same as wireway above except the construction is raintight and the cover is gasketed.
2. Cover is removed from side with screws.
3. Finish shall be corrosion resistant.

2.2 PRODUCTS

A. Wireway

1. Square D Square Duct
2. States Electric
3. Hoffman Electric

PART 3 - EXECUTION

3.1 INSTALLATION

A. Wireway

1. All hangers shall be mounted at frequency not to exceed 5' on center.
2. Coordinate location in ceiling space with structure and Division 15 trades such that accessibility is maintained.
3. Routing shall be parallel to building construction.
4. Install complete with all related appurtenances included.

B. Raintight Wireway

1. Routing shall be parallel to building construction.
2. Mounting shall be as shown on drawings at hanger or support frequency not to exceed 5' on center.
3. Touch-up all areas where paint has been chipped, scratched, etc. to prevent corrosion.

END OF SECTION

SECTION 16111
CONDUIT

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Metallic Conduit

B. Flexible Conduit

C. Non-Metallic Conduit

D. Couplings and Fittings

E. Related Components

1.2 RELATED WORK

A. Section 16010, Coordination

B. Section 16050, Basic Materials and Methods

PART 2 - PRODUCTS

2.1 MATERIALS AND COMPONENTS

A. Metallic conduit: Rigid threaded, intermediate threaded, electrical metallic tubing.

B. Flexible Conduit - Steel and liquid tight.

C. Non-metallic - Schedule 40 poly vinyl chloride.

D. Couplings and Fittings

1. Rigid and Intermediate - Steel-threaded type.
2. Electrical Metallic Tubing - Steel set screw type, except in damp locations, use steel raintight compression type.
3. Steel Flexible - Steel set screw type.
4. Liquid Tight - Steel compression type.
5. Non-Metallic - Threadless Type - PVC Schedule 40

E. All metal conduit to be hot dip galvanized process or aluminum.

F. Related Components

1. Where required, provide cable strain relief, grounding connectors, expansion fittings.

2.2 ACCEPTABLE MANUFACTURERS

A. Conduit

1. Triangle
2. Republic
3. Youngstown
4. Carlon
5. V.A.W. of America
6. Allied

B. Couplings, Fittings and Related Components

1. T & B
2. O.Z.
3. Kellems
4. Crouse-Hinds
5. Appleton

PART 3 - EXECUTION

3.1 INSTALLATION

A. All wiring to be encased in conduit or its electrical equivalent unless shown otherwise.

B. Rigid or intermediate conduit shall be used for voltages over 600 volt; underground; in or under concrete floor slabs on grade; in exterior masonry walls, in wet locations; when exposed below 5'-0" A.F.F.; and as National Electrical Code dictates.

C. Electrical metallic tubing shall be used where not restricted by this section.

D. Flexible steel conduit shall be used for lighting fixture drops from junction boxes.

1. 1/2" trade size shall be used unless local codes allow 3/8".

E. Flexible liquid tight conduit shall be used on all motor and vibrating equipment connections.

1. Use minimum 1/2" size, 18" - 24" long.
2. Use grounding type fittings.
3. Provide grounding conductor.

F. Non-metallic conduit <u>shall be used only</u> where called for on Contract Drawings.

G. Vertical conduit runs shall be supported every floor for conduit less than 2 1/2" and every other floor for runs 2 1/2" and greater.

1. Cable supports as per National Electric Code.

H. All conduit in finished areas shall be concealed in building construction.

I. Where conduit is run exposed, it shall conform to the following:

1. Approval given by Engineer, unless shown exposed.
2. Routed parallel with building construction.
3. Installed in workmanlike manner.
4. Where surface mounted at a height of 5' or less, conduit shall be rigid or intermediate metal conduit.

J. At building expansion joints, provide conduit expansion couplings with ground fittings.

K. Conduit shall not be routed through structural slabs, beams or columns unless approved by Structural Engineer.

L. Maintain adequate clearance from heat generating pipes or equipment.

M. Conduit shall not be mounted on mechanical or other equipment which vibrates except at connection points.

END OF SECTION

SECTION 16120
CONDUCTORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. 600 volt conductors.

1.2 RELATED WORK

A. Section 16050: Basic Materials and Methods.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide 98% commercially pure copper conductors.

B. Insulation shall be Type THW, THHN, THWN or XHHW.

1. In areas where cables are subjected to ambient temperatures over 90° F. or near process equipment, in lighting fixtures, etc., provide insulation suited for purpose.

C. Conductors #8 and larger shall be stranded.

2.2 MANUFACTURERS

A. Triangle

B. Anaconda

C. Cyprus

D. G.E.

E. Pirelli

PART 3 - EXECUTION

3.1 INSTALLATION

A. Branch circuit wiring shall be #12 AWG unless shown otherwise.

B. Control wiring may be #14 AWG.
C. Identification.
1. 120/208 Volt color code.
a. Phase A - Black
b. Phase B - Red
c. Neutral - White
d. Ground - Green

2. 277/480 Volt color code.
a. Phase A - Brown

b. Phase B - Orange
c. Phase C - Yellow
d. Neutral - Gray
e. Ground - Green

3. Control wiring shall be marked at both ends as to its function.
4. Spare conductors shall be identified as such.

D. Before conductors are pulled through any raceway system, the system shall be free of moisture and foreign matter.

E. Joints and splices in branch circuit conductors shall be made with spring lock type connectors.

1. Minnesota Mining
2. Ideal

F. Joints and splices in feeder conductors shall be made with pressure type metal connectors and insulated with heat shrink plastic jacket or taped.

1. T & B
2. Burndy

END OF SECTION

SECTION 16131
PULL AND JUNCTION BOXES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Pull Boxes

B. Junction Boxes

1.2 REFERENCE

A. Section 16010 - Coordination

B. Section 16050 - Basic Materials and Methods

PART 2 - PRODUCTS

2.1 MATERIALS

A. Code gauge galvanized steel in concealed and unfinished spaces, prime painted steel in finished spaces.

B. Cover shall be secured with screws.

C. Provide gasketing where dust or moisture exists.

D. Cast metal boxes shall be used in vapor tight or explosion proof environments.

2.2 MANUFACTURERS

A. States Electric

B. Square D

C. O.Z.

D. Hoffman

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide boxes to facilitate pulling or splicing conductors.

1. Review locations with Engineer prior to installation.

B. Mount boxes with 1/2" space behind in damp locations.

C. Mount boxes to allow for maximum flexibility.

D. Install grounding bushings with bonding conductor on all conduits entering box.

END OF SECTION

SECTION 16133
CABINETS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Electrical cabinets such as panelboards.

B. Communication cabinets used to supplement wiring (does not apply to main cabinets furnished with communication systems).

C. Special cabinets such as low voltage relay cabinets.

1.2 REFERENCE

A. Section 16050 - Basic Materials and Methods.

B. Section 16164 - Branch Circuit Panelboards.

C. Sections relating to communications and special systems.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Shall be galvanized steel with welded corners.

B. Size per drawings or per functional characteristics of cabinet.

1. Gutter space shall be considered in sizing.
2. Subfeeds shall be considered in sizing.

C. Doors shall have lockable covers.

1. Paint all doors with baked enamel finish.
2. Doors over 40" in height shall have vault turn handles with 3 point securing bolts.
3. Keying for all electrical cabinets shall be the same.
4. Keying for all communication and special cabinets shall be the same.
5. Electrical panels shall have concealed hinge door-in-door construction type covers.
6. Communication and special systems shall have concealed hinged covers.
7. Provide a directory card, card holder and plastic cover on the inside of cover for circuit numbers, terminal identification, etc.
8. Terminals provided in communication and special systems cabinet shall be provided with 20% spare terminals.

2.2 MANUFACTURERS

A. Square D

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set cabinets in alignment with building construction.

END OF SECTION

SECTION 16134
OUTLET BOXES

PART 1 – GENERAL

1.1 WORK INCLUDED

A. Outlet Boxes

1.2 RELATED WORK

A. Section 16140: Wiring Devices

PART 2 – PRODUCTS

2.1 MATERIALS

A. All outlets shall be equipped with outlet boxes approved for the use.

B. All outlet boxes shall be sized as per National Electrical Code.

C. Boxes shall either be pressed steel with knockouts or cast with threaded hubs.

D. Boxes shall be of high conductive metal to maintain maximum electric continuity unless otherwise noted.

E. Sectional boxes shall not be used.

F. Boxes employed in exposed runs shall be of types adapted to surface work and for which suitable plates and covers are available.

1. Such covers or plates shall conform substantially to the outlet of the boxes with no projecting edges or corners.

G. Cast boxes or fittings of vaportight or explosion proof types shall have suitable mounting lugs of feet cast integral with the fitting body.

H. Conduit fittings ("LB", "C", "T") or types approved for the location may be employed as required to facilitate pulling in conductors.

I. Minimum outlet box size shall be 4" square except where noted otherwise or when installed in masonry.

1. Provide a 3-3/4" deep box for masonry construction.
2. Provide extension ring to suit finish material.
3. All boxes shall be covered if not in use.

2.2 MANUFACTURERS

A. Raco

B. Steel City

C. Appleton

PART 3 – EXECUTION

3.1 INSTALLATION

A. All outlet boxes shall be set plumb level and not more than 1/8" back from finished surface.

B. Location of lighting outlets as shown shall be coordinated with the architectural and mechanical drawings before installation.

C. Heights are given from the center of the outlet box to the finish floor, directly below outlet.

D. Exterior outlet heights are given from floor inside adjacent door, or if no door, from first floor above grade unless noted otherwise.

E. All flush wall receptacles located above counters of work tables shall be installed with long dimension of plate horizontal.

F. Contractor shall verify heights of all outlets located above wall mounted equipment to assure locations of outlets to be above top of equipment.

G. Where outlets occur in exposed concrete block or brick walls, heights and horizontal positions of outlets shall be adjusted to bring one side and the top or bottom of the box at a mortar joint.

H. Door swings shall be checked in the field before locating switches.

I. Receptacles, switches, thermostats, and similar devices shall be located for maximum protection against mechanical injury.

J. Outlet boxes shall not be mounted back to back with through-box. Provide separate outlet boxes offset with flexible conduit loop connection or separate feeds.

END OF SECTION

SECTION 16140
WIRING DEVICES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Switches

B. Receptacles

C. Dimmers (Wall Box Style)

D. Cover Plates

E. Special Devices

1.2 RELATED WORK

A. Section 16134: Outlet Boxes

1.3 REGULATORY AGENCIES

A. NEMA Standards

PART 2 - PRODUCTS

2.1 MATERIAL

A. Switches

1. Switches shall be quiet mercury or mechanical type offering silent operation.
2. Toggle switches shall be rated at 20 amp, 277 volt A.C.
3. Momentary contact switches shall be single pole, double throw, center off and rated at 20 amps, 120 volt A.C.
4. All switches shall be grey unless otherwise specified.

B. Receptacles

1. All receptacles must be of a material which will not crack such as bakelight when pulling-up on ground pin.
2. Receptacles shall be back and side wired.
3. Receptacles shall be NEMA 5-20R and rated at 20 amps, 120 volts, A.C.
4. All receptacles shall be grey unless otherwise specified.

C. Dimmers

1. Dimmers shall be sized as per drawings.
2. Plate and control to match other devices.

D. Device Plates

1. Shall be provided over every device.
2. Shall be stainless steel #430.

E. Special Devices

1. Shall be as specified on drawings.
2. Floor outlets shall be flush mounted with bronze watertight plate assembly.

    a. Receptacles shall be as specified with bronze hinged cover.
    b. Communication box shall have bronze plate with 3/4" 0/ plug.
    c. Carpet flange shall be provided where applicable.

2.2 MANUFACTURERS

A. Switches

1. Hubbell 1221 - Grey
2. Slater Medalist Series - Grey
3. Arrow Hart - 1991 Grey
4. G.E. - 5951 Grey
5. Leviton 1221 - Grey
6. P & S - 20 AC1 - Grey

B. Receptacles

1. Hubbell 5362 - Grey.
2. Slater Medalist Series - Grey.
3. Arrow Hart 5362 - Grey.
4. G.E. Gen5362 - Grey
5. Leviton 5362 - Grey
6. P & S 5362 - Grey

C. Dimmers

1. Lutron Centurion

D. Device Plates

1. Hubbell
2. Slater
3. Arrow Hart
4. Sierra
5. G.E.
6. Leviton

E. Special Devices

1. Hubbell, Slater, Arrow Hart, G.E., Leviton

PART 3 - EXECUTION

3.1 INSTALLATION

A. All outlets requiring a device shall be equipped with new devices as specified.

B. Receptacles shall be installed with the ground opening on the top side.

C. Horizontally installed receptacles shall have the neutral terminal on top and the ground terminal to the left.

D. All receptacles and plates burned or discolored by use during the construction process shall be replaced.

E. Mount dimmers in separate outlet boxes from switches.

F. Dimmers shall be ganged such that they maximize wattage rating.

END OF SECTION

SECTION 16163
DISTRIBUTION PANELBOARDS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Distribution Panelboards

1.2 RELATED WORK

A. Section 16050: Basic Materials and Methods

B. Section 16133: Cabinets

C. Section 16181: Fuses

D. Section 16990: Schedules

PART 2 - PRODUCTS

2.1 MATERIALS

A. Construct distribution panelboards to UL standards and provide UL labels.

B. Enclosure

1. Distribution panelboard shall consist of wall mounted, completely enclosed, metal structure, incorporating circuit breakers as indicated on the schedule.
2. Provide gutter space as per code at the lug end (top or bottom) of the panel.
3. Shall be front accessible, unless otherwise specified.

C. Bus bracing shall be as shown on the schedule.

D. A ground bus rated at 50% secondary bus amperes (minimum 1/4" x 2") shall connect incoming and outgoing feeder conduits.

E. Shall have tin plated electrical grade aluminum bus sized on the basis of not more than 750 ampere per square inch current density.

F. The arrangement of the three busses shall be A, B and C from front to back, top to bottom, or left to right, as viewed from the front of the panel.

G. Circuit Breakers

1. Shall be molded case, quick-make, quick-break, thermal-magnetic, trip indicating, and have common trip on all multiple pole breakers.
2. Shall be bolt-on type.
3. Ampere rating shall be identified by molded or engraved numbers.
4. Interrupting ratings shown on panelboard schedule shall apply to circuit breakers.

2.2 MANUFACTURERS

A. Square D

PART 3 - EXECUTION

3.1 INSTALLATION

A. Distribution panelboards shall be wall mounted plumb and true with building surfaces in locations as shown.

B. Feed and branch circuit conductor shall meet the cabinet squarely and shall be arranged insofar as possible to facilitate training of conductors to their respective terminals.

C. Conductors shall be neatly formed into groups secured with tape or cord and carefully placed into gutter space.

D. Identification plate shall include: panel, voltage and feeder. For example: "Panel LV-1, 120/208V, 30/, 4W, 4 #4/0 THHN, 2" C".

E. Incoming line feeder connection shall be compatible with incoming feeder.

END OF SECTION

SECTION 16164
BRANCH CIRCUIT
PANELBOARDS

PART 1 - GENERAL

A. WORK INCLUDED

B Branch Circuit Panelboards

1.1 RELATED WORK

A. Section 16050: Basic Materials and Methods

B. Section 16133: Cabinets

C. Section 16990: Schedules

PART 2 - PRODUCTS

2.1 MATERIAL

A. Construct panelboards to UL standards and provide UL labels.

B. Enclosure

1. Provide required gutter space at the lug end (top or bottom) of the panel. Where cables feed through panels, cabinet shall have an additional 4 inch width added to the gutter space on one side.
2. Enclosures shall be 5-1/4" - 5-3/4" deep.

C. Panelboards shall be of type and contain overcurrent protective devices as listed on the schedules.

D. Panelboard shall be provided with insulated neutral bar complete with necessary lugs and terminals.

E. Panelboard shall be provided with a 1/4" x 1" x 12" long ground bus with ground wire terminations (where indicated, ground bus shall be isolated from enclosure).

F. Panelboard Bus Assembly

1. Bus work shall be fabricated of soft drawn copper or aluminum. Lugs shall be provided for connection of feeders.
2. All current-carrying parts of the bus assembly shall be plated.

G. Circuit Breakers

1. Shall be molded case, quick-make, quick-break, thermal-magnetic, trip indicating, and have common trip on all multiple pole breakers.
2. Shall be bolt-on type.

3. Ampere rating shall be identified by moulded or engraved numbers.
4. Interrupting ratings shown on panelboard schedule shall apply to circuit breakers.

2.2 MANUFACTURERS

A. Square D

PART 3 - EXECUTION

3.1 INSTALLATION

A. Panelboards shall be mounted plumb and true with building surfaces in locations as shown.

B. Feed and branch circuit conduits shall meet the cabinet squarely and shall be arranged insofar as possible to facilitate training of conductors to their respective terminals.

C. Branch circuit conductors shall be neatly formed into groups, secured with tape or cord, and carefully placed into gutter space.

D. Provide spare raceway for future use for each flush mounted panelboard. Install 4-3/4" conduits extending into the ceiling space above the panelboard with capped end and tagged, "Spare Use".

E. Circuit numbers as installed shall match circuit numbers on panelboard schedule.

F. Panel directory shall be typed.

G. Identification plate shall include panel, voltage and feeder. For example: "Panel LV-1, 120/208V, 30/, 4W, 4 #4/0 THHN, 2"C".

H. Incoming line feeder connection shall be compatible with incoming feeder.

END OF SECTION

SECTION 16170
DISCONNECT SWITCHES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Non-Fused Disconnect Switches

B. Fused Disconnect Switches

1.2 RELATED WORK

A. Section 16050: Basic Materials and Methods
B. Section 16155: Motor Starters
C. Section 16181: Fuses
D. Section 16990 - Schedules

PART 2 - PRODUCTS

2.1 MATERIALS

A. All disconnect switches shall be NEMA heavy duty Type H.D. and U.L. listed.

2.2 GENERAL REQUIREMENTS

A. Provide enclosed disconnect switches on water heaters, duct heaters, unit heaters, motors and miscellaneous equipment as indicated on the drawings or as required by code.

B. Provide six (6) pole disconnect switches for two speed motors.

C. Switch Interior - All switches shall have switch blades which are fully visible in the off position when the door is open. Switches shall be of dead-front construction with permanently attached arc suppressors hinged or otherwise attached to permit easy access to line-side lugs without removal of the arc suppressor. Lugs shall be UL listed for copper and/or aluminum cables and front removable. All current carrying parts shall be plated by electrolytic processes.

D. Switch Mechanism - Switches shall have a quick-make and quick-break operating handle and mechanism which

shall be an integral part of the box, not the cover. Switches shall have a dual cover interlock to prevent unauthorized opening of the switch door in the ON position or closing of the switch mechanism with the door open.

E. Enclosures- Interior switches shall be furnished in NEMA 1 general purpose enclosures. Exterior switches shall be furnished in NEMA 3R enclosures unless otherwise specified. Covers on NEMA 1 enclosures shall be attached with pin type hinges. Raintight covers shall be securable in the open position.

Enclosures shall be code gauge (UL 98) sheet steel (NEMA 1) or code gauge (UL 98) galvanized steel (NEMA 3R). They shall be treated with a rust-inhibiting phosphate and finished in gray baked enamel.

2.3 MANUFACTURERS

A. Square D

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switches in an accessible location as convenient as possible to equipment served.

B. Disconnect switches installed on outside walls below grade shall be mounted on 3/4" exterior grade painted plywood backing at least as large as the switch.

END OF SECTION

SECTION 16181
FUSES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Fuses

B. Fuse Cabinet

1.2 RELATED WORK

A. Section 16050: Basic Materials and Methods

B. Section 16133: Cabinets

C. Section 16155: Motor Starters

D. Section 16163: Distribution Panelboards

E. Section 16170: Disconnect Switches

F. Section 16990: Schedules

PART 2 - PRODUCTS

2.1 MATERIAL

A. All fuses shall be of the same manufacturer.

B. Fuses for motor circuits, 600 amperes and less:

1. U.L. Class RK5, time delay with interrupting ratings of 200,000 amperes.
2. Shall also serve remote fused disconnect switches.
3. Shall be rejection type.

C. Provide one set of spare fuses for each size and type of fuse represented on project. Provide cabinet to contain all spare fuses. Identify as "spare fuse cabinet".

2.2 MANUFACTURERS

A. Fuses for motor circuits:

1. Bussman Fusetron, FRN-R (250V), and FRS-R (600 V).
2. Gould Shawmut Trionic, TR-R (250 V) and TRS-R (600 V).
3. Reliance, ECNR (250V) and ECSR (600V)

B. Special application:

1. For in-line fuses and weatherproof assembly, provide Bussman Tron Type HEB fuse holder and Type KTK fuse

with 1A0513 boot.

2. For protection of control circuit transformers, provide Bussman Type FNQ time delay fuses.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All fusible switches either separately mounted or panel mounted shall be equipped with fuses as specified herein.

B. Provide label inside each switch and motor starter cover stating type of fuse required for replacement.

C. Mount fuse cabinet near main service entrance equipment.

D. Fuses shall not be installed until equipment is ready to be energized.

END OF SECTION

SECTION 16400
SECONDARY SERVICE AND
DISTRIBUTION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide a complete secondary power and distribution system.

B. Secondary service characteristics are as shown on drawings.

C. Service to emanate from the power company's padmount transformer through the customer's service tap box and extend with conduit to the main distribution panelboard.

D. Feeders are extended from the main distribution panelboard to various loads such as panelboards, dimmer cabinets, etc.

1.2 RELATED SECTIONS

A. Section 16010: General Provisions

B. Section 16050: Basic Materials and Methods

C. Section 16111: Conduit

D. Section 16163: Distribution Panelboards

E. Section 16164: Branch Circuit Panelboards

F. Section 16430: Metering

G. Section 16450: Grounding

H. Section 16990: Schedules

PART 2 - PRODUCTS

2.1 MATERIAL

A. All service entrance conduit to be intermediate metallic or rigid.

B. Busduct shall be feeder type.

2.2 MANUFACTURERS

A. As specified in related sections.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide for payment of all power company fees.

B. Provide for coordination with power company's equipment.

END OF SECTION

SECTION 16410
GROUNDING

PART 1 - GENERAL

1.1 The entire electrical system shall be grounded. The following items of equipment, appurtenances, and as required by Article 250 of the NEC, shall be grounded:

A. Electric service, equipment and enclosures

B. Conduits and raceways

C. Neutral and ground conductors

D. Switches, breakers, panels

E. Motor frames, controller cabinets, lighting fixtures

PART 2 - PRODUCTS (As specified elsewhere)

PART 3 - EXECUTION

3.1 Boding jumpers to maintain ground continuity at raceway and pull box expansion joints shall be stranded cable or copper braid sized in accordance with Article 250 of the NEC and installed with approved ground fittings.

3.2 Grounding jumpers shall be installed across all water meters. Jumpers shall be stranded bare copper cable or copper bus attached by means of exothermic welds to the water pipe.

3.3 Grounding shall be accomplished by means of a metallic water system, where possible, or grounding assemblies. Where not possible, the following method will be used.

A. Ground rods shall be installed with the top of the rods at least 6" below finished grade. Grounding conductors shall be so installed as to permit shortest and more direct path from equipment to ground. All connections to ground conductors shall be accessible for inspection and made with exothermic welds, or approved bolted connectors where permitted. All contact surfaces shall be thoroughly cleaned before connections are made to insure good metal-to-metal contact.

3.4 Single-rod assemblies shall consist of one (1) copper-clad steel ground rod 3/4" diameter, length as required by ground test section with minimum length of 8'-0". All connections to the rod shall be made with exothermic welds.

3.5 Grounding Connectors: Cadwell exothermic at all rods and terminations below grade, bolt pressure connectors above grade.

3.6 Where the underground portion of a metallic water pipe system being used for the grounding electrode is less than 30'-0", additional electrodes shall be used as outlined in Article 250 of the NEC.

3.7 A separate ground wire shall be included with feeder to respective panels from switchboard.

END OF SECTION

SECTION 16500
LIGHTING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. The work covered by this section includes the furnishing and complete installation of all lighting equipment as shown, described in the fixture schedule (Section 16990) and as specified herein.

1.2 RELATED WORK

A. Section 16050: Basic Materials and Methods

B. Section 16501: Lamps

C. Section 16502: Ballasts and Accessories

D. Section 16990: Schedules

1.3 SUBMITTALS

A. Shop drawings shall be furnished for each fixture type.

1. Catalog cuts, illustrating conformance with specifications, will be acceptable for standard units.
2. Drawings shall indicate material assembly and finish. No fabrication shall begin without review of shop drawings.
3. Specification sheets shall include but not be limited to a dimensioned drawing of the assembled fixture, description of materials and finish of the lens, frame, housing reflector and any special accessories, recommended lamp, and list of agencies which have labeled the fixture.
4. Photometric report shall be equal to the standard report furnished by E.T.L., including candlepower distribution curves and tables, luminaire brightness readings, tabulation of coefficients of utilization and percent efficiency, and a description of the unit and test conditions and shall be furnished for all fixtures in quantity greater than 30 units, or where otherwise required.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. See Fixture Schedule

2.2 INCANDESCENT FIXTURES

A. All incandescent units, 300 watts and larger shall have mogul base, unless noted otherwise.

B. All incandescent fixture sockets and reflectors shall be secured to body to prevent rotation or rocking during relamping procedures.

C. Each recessed fixture shall have a special mounting frame with an attached junction box, so that the can and frame could be installed and connected to branch circuits without installing any final trim, diffusers, or lenses. Provide separately mounted junction box where local code requires.

D. All trims and lenses shall be fastened or hinged to the fixture body so that no part of the fixture must be held during the relamping procedure.

E. Attached junction boxes on recessed fixtures shall be pre-wired and shall meet all code requirements for space, heat dissipation, accessibility, etc.

F. Recessed fixtures shall be NEC rated for application used. All recess of fixtures shall be thermally protected.

2.3 FLUORESCENT FIXTURES

A. Fixture bodies shall be die-formed rigid housing with all surfaces finished in baked enamel where not indicated otherwise. Diffusers shall be as specified under each respective fixture and shall be framed in a hinged,

continuous assembly, which shall be removable without tools and which can be opened or closed by pressure which the hand is capable of applying. Provisions shall be incorporated for safe suspension of the frame in the open position without accidental dislodgement. There shall be a gasketed seat between
the frame and fixture body to prevent light leaks.

B. Fixture wiring shall be 600 volt, suitable for the purpose, and shall have all interconnections made between sockets and ballasts to 12" pigtails, permitting a one-point branch circuit connection.

C. Fixtures on exterior shall have ballasts designed for minus 20° F. as indicated and/or required for applied location.

D. All diffusers, lenses,side panels, etc., are to be of .125" thick acrylic plastic unless noted otherwise. Lens prism shall be full size with minimum 10 ounce per square foot density.

E. Deep celled louvers shall be a minimum of .025" thick and of the specularity as scheduled.

F. No manufacturer's labels shall be visible.

G. All fixtures of the same type shall be of one manufacture and of identical finish and appearance. Locate fixture outlets and recessed fixtures by reference to the Architectural Drawings and measurements of building construction.

2.4 HIGH INTENSITY DISCHARGE FIXTURES

A. Sockets shall be porcelain screw-type mogul or medium units, securely fastened to fixture body in such manner as to prevent twisting or rocking of socket when installing or removing lamp.

B. Complete fixtures shall be factory sound rated.

C. Recessed fixtures shall be rated for application used.

PART 3 - EXECUTION

3.1 FIXTURE INSTALLATION

SECTION 16500
LIGHTING

A. All lighting equipment shall be installed complete, including canopies, suspensions of proper lengths, hickeys, casings, sockets, holders, reflectors, ballasts, diffusing material, louvers, plaster frames, lamps recessing boxes, etc., all wired and assembled and ready for operation. All recessed fixtures shall be provided with frames appropriate for the ceiling in which fixtures are recessed. Provide supporting brackets and channels as required.

B. Proper supports shall be provided for hanging all lighting fixtures which will transmit the load to suitable building members adequate for fixture weight. The Contractor shall acquaint the Architect with all details of fixture hanging methods he proposes to use sufficiently in advance of installation to permit a determination as to their adequacy. All details of fixture hangers and supports shall be designed to resist vibration and shock where such factors are encountered, such as in the manufacturing areas. The ceiling system may be relied upon for fixture support. The Contractor, however, is responsible for ceiling system supporting fixtures. Surface mounted fixtures shall be mounted rigidly.

C. Fixture mounting shall be correlated with factory representative before fixtures are shipped.

D. Suspended fixtures shall be stem-mounted and shall be free to swing 20° in any direction. Ceiling swivels shall be of the ball aligner type. Continuous rows of suspended fluorescent fixtures shall be installed with an approved swivel at the junction of stem and fixture. Chain suspension may be used only where specifically permitted on the drawings. Chain shall be heavy duty, nickel or cadmium plated, suitable for weight of specific fixture. Jack chain shall not be used.

E. Any fixture with weight of 10 lbs. or more shall not be mounted on or suspended from the outlet box cover nor fastened to the box with two screws.

F. Where floodlighting has been indicated, the Contractor shall provide for adjusting units during evening hours.

G. Directional fixtures shall be aimed as directed by Engineer.

H. Surface fixtures mounted on combustible low density fiberboard ceilings shall have 1-1/2" spacers per code requirements.

I. Outlets for fluorescent fixtures shall be located as required by the specific fixtures.

J. Sockets shall be securely fastened to brackets or socket straps with machine screws in a manner to eliminate excessive flexing under normal lamp pressure, and shall be replaceable without removing fixture from the installation. In fixtures with end plates, sockets shall be backed up by the fixture housing to prevent twisting. Where sockets cannot be backed up by housing they shall be secured with two screws or bolts. Socket contacts shall be silver plated.

END OF SECTION

SECTION 16501
LAMPS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Lamps

1.2 RELATED WORK

A. Section 16500: Lighting

B. Section 16502: Ballasts and Accessories

C. Section 16990: Fixture Schedule

PART 2 - PRODUCTS

1.1 ACCEPTABLE MANUFACTURERS

A. General Electric

B. Osram Sylvania

C. Philips

1.2 ADDITIONAL LAMP REQUIREMENTS

A. Fluorescent lamps shall be T82, medium Bi-Pin, 3500K, 75CRI, unless otherwise noted.

B. Incandescent lamps shall be 130 volt where applicable.

PART 3 - EXECUTION

1.1 INSTALLATION

A. Furnish and install lamp(s) for each fixture of type and wattage as called for in Fixture Schedule, Section 16990.

END OF SECTION

SECTION 16741
TELEPHONE RACEWAY
SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Telephone Raceway

1.2 RELATED WORK

A. Section 16050 - Basic Materials and Methods

B. Section 16110 - Wireway

C. Section 16111 - Conduit

D. Section 16113 - Cabinets

E. Section 16134 - Outlet Boxes

F. Section 16140 - Wiring Devices

1.3 DESCRIPTION OF SYSTEM

A. Provide an empty telephone raceway system for the telephone utility's wiring as indicated on the drawings and as specified herein.

B. Distribution throughout the building shall be through sleeves, cable trays, wireways and empty conduits stubbed from boxes into ceiling space. Empty conduits are to be utilized where the above are not practical such as exposed areas.

C. Provide outlets with plate finish as described in Section 16140.

PART 2 - PRODUCTS

1.1 MATERIALS

A. As applicable under related work.

B. Provide device plate coordination with telephone company.

C. Activated telephone outlet shall have cover plate to match Section 16140 plates and accept modular jack.

D. Non-activated telephone outlets shall have a 1/2" bushed hole in cover plates to match Section 16140 plates.

E. Furnish and install all plywood terminal boards sized as shown on drawings. Plywood to be 3/4" x 8'-0" high and

shall be painted with two coats of fire retardant marine grey enamel. Hold plywood up 2" above finished floor.

F. Wiring, instruments and equipment will be furnished and installed by the telephone company or private phone system supplier.

PART 3 - EXECUTION

1.1 INSTALLATION

A. Electrical work in main telephone equipment room shall be installed as shown on drawings and shall be coordinated with the telephone company.

B. All sleeves having cables installed and/or empty are to be filled with an approved fireproofing sealer to maintain the fire integrity of the floor slab.

C. Bush all conduits.

D. Provide a #6 grounding conductor at all terminal boards.

END OF SECTION

SECTION 16921
MECHANICAL EQUIPMENT
WIRING

PART 1 - GENERAL

1. WORK INCLUDED

A. Mechanical Equipment Wiring

2. RELATED WORK

A. Section 16050: Basic Material and Methods

B. Section 16155: Motor Starters

C. Section 16990: Schedules

3. SPECIAL REQUIREMENTS

A. Furnish and install all conduit, outlets, wiring, disconnects, relays, pilot lights, starters, etc., as specified, shown on the drawings or required for the specified operation of the equipment.

B. Make electrical connections to all motors, starters, pushbutton stations and other control devices in accordance with the schedule on the drawings and as hereinafter specified. Where so indicated in the schedule or noted on the drawings, this Contractor shall furnish and install complete: starters, pushbutton stations, and auxiliary equipment. All motors will be furnished and set in place by others but shall be connected by this Contractor.

C. The Contractor shall refer to the Mechanical Division of the Specifications and the Electrical and Mechanical Drawings to determine the scope of this work.

PART 2 - PRODUCTS

1. MATERIAL

A. Motor starters will be furnished and installed by this Contractor unless specified or noted otherwise.

B. Where pushbutton and/or pilot light stations are specified or scheduled, heavy duty units shall be provided unless otherwise specified. Where toggle switches are specified for control means standard toggle switches specified elsewhere in this specification are to be used. In equipment spaces NEMA I enclosures shall be provided for pushbutton and pilot light units. In finished areas, pushbutton and pilot light units shall be mounted in flush plates of same design and manufacture as

device plates. All pilot lights shall be neon with clear lens.

2. MANUFACTURERS

A. Square D

PART 3 - EXECUTION

A. INSTALLATION

1. Furnish and install all power wiring, consisting of wiring from power outlet or safety switch to the starter and from starter to the motor, for all motors on the job site.

2. The Contractor shall verify that all overloads are the correct size for the motor service based on the motor name plate data. The proper overloads shall be provided and installed by this Contractor.
3. All wiring for unit heaters shall be installed by this Contractor. All required controls will be provided by others, but shall be set in place and connected by this Contractor.
4. Provide and install all wiring and conduit to single phase exhaust fans.

END OF SECTION

SECTION 16990
SCHEDULES

PART 1 - GENERAL

1. WORK INCLUDED

A.The following schedules are provided on Drawings.

1. Main Distribution Panelboard
2. Panelboard
2. Motor and Equipment
4. Lighting Fixture
5. Kitchen Equipment Schedule

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION