

NORTH BRANCH AREA SCHOOL DISTRICT REQUEST FOR BIDS

North Branch, MI. 48461

Posted December 19, 2023

BIDS ARE DUE: January 3, 2024 BY 2:00 P.M.

At North Branch Area Schools Central Office

6655 Jefferson St

North Branch, MI 48461

I. BID

1. Purpose Of Bid:

North Branch Area School District is seeking bids from a qualified general contractor to construct an addition to the maintenance storage building adjacent to the football field located at 6598 Brush St, North Branch, MI 48461

Bid Terms:

A. North Branch Area School District reserves the right to reject any or all bids for no reason.

B. Bids must be signed by an official authorized to bind the contractor to its provisions for at least a period of 90 days. Failure of the successful proposer to accept the obligation of the bid may result in the cancellation of any award.

C. In the event it becomes necessary to revise any part of the RFB, addenda will be provided. Deadlines for submission of the RFB's may be adjusted to allow for revisions. Emailed bids will not be accepted.

D. Bids should be prepared simply and economically, providing a straight-forward concise description of the contractor's ability to meet the requirements of the RFB.

E. A formal written contract will be executed between North Branch Area School District and the awarded contractor.

II. BID SPECIFICATIONS

The bid response shall include all of the following information. Failure to include all of the required information may result in disqualification of a bid.

1. Contractor's qualifications, years in business, and experience in providing the level and type of work specified in the bid.

2. Bank References with name and phone number of contact person.

3. At least three (3) current references from owners of similar projects listed in the bid. Include company name, contact name and phone number.

III. GENERAL SPECIFICATIONS

1.Site Details

A. Please see attached plan documents.

B. Job must be substantially completed by March 31, 2024 and fully completed by April 30, 2024.

C. The bidder shall, before submitting the bid, carefully examine the proposal, plans, specifications, and contract documents. The bidder shall inspect in detail the site of the proposed work and be familiar with all the local conditions affecting the contract. If successful, the bidder will be responsible for all errors in the proposal resulting from failure or neglect to comply with these instructions. North Branch Area Schools will, in no case, be responsible for any change in anticipated profits resulting from such failure or neglect.

2. Project Specifications

- A. The contractor shall provide all labor, materials, equipment, subcontractors and supervision for completion of the project. This includes general construction and electrical work associated with the project.
- B. All clean up shall comply with all applicable Federal, State, and local laws and regulations.
- C. Contractor shall, at all times, keep the site free from accumulation of waste materials, debris or rubbish caused by his or her employees at work. Contractor shall remove from the site all tools, surplus materials, debris or rubbish and shall leave the site and the work in a neat and orderly fashion at the completion of the work.
- D. Arrangements may be made, in advance, by Contractor for leased waste containers for disposal of construction debris at Contractor's expense.
- E. No smoking or drinking is allowed on any school premises.

3. Bid Security/Performance Bond

- A. Accompanying this proposal shall be a Bid Bond (or Certified/Cashier's Check) as surety in an amount of no less than ten percent (10%) of the Base Bid, payable to North Branch Area Schools, which will be forfeited if the undersigned fails to execute the contract in conformity with specifications stated herein.
- B. The successful bidder further agrees to provide a Performance Bond in an amount equal to five percent (5%) of the total contract cost included in the bid submission.

IV. CONTRACT PROVISIONS

If a contract is awarded, the selected contractor will be required to adhere to a set of general contract provisions which will become a part of any formal agreement.

1. Reporting of Contractor

- A. The Contractor is to report to North Branch Area Schools Facilities Manager and/or designee and will cooperate and confer as necessary to insure satisfactory work progress.
- B. All reports, estimates, memoranda and documents submitted by the Contractor must be dated and bear the Contractor's name.
- C. All reports made in connection with these services are subject to review and final approval by the Facilities Manager prior to payment.
- D. North Branch Area Schools may review and inspect the Contractor's activities during the term of this contract.
- F. Lien waivers must be put in place for all subcontractors and materials purchased.
- G. Contractor is responsible for all expenses related to transportation of staff, equipment and materials and disposal of debris.
- H. Contract must secure all necessary permits according to local and state laws and regulations.

2. Personnel

- A. The Contractor will not hire any North Branch Area Schools employees for any of the required services without the North Branch Area Schools written approval in advance.

- B. The parties agree that the Contractor is neither an employee nor an agent of North Branch Area Schools for any purpose.

3 Indemnification Agreement

The Contractor will protect, defend and indemnify North Branch Area Schools, its officers agents, assigns, volunteers and employees from any and all liabilities, claims, liens, fines, demands and costs, including legal fees, of whatsoever kind and nature which may result in injury or death to any persons, including the Contractor's own employees, and for loss or damage to any property, including property owned or in the care, custody or control of North Branch Area Schools in connection with or in any way incident to or arising out of the occupancy, use service, operations, performance or non-performance of work in connection with this contract resulting in whole or in part from negligent acts or omissions of contractor, any sub-contractor, or any employee, agent or representative of the contractor or any sub-contractor.

4. Insurance Requirements

- A. The Contractor will maintain at its own expense during the term of this Contract, the following insurance: Workers' Compensation insurance with Michigan statutory limits and Employers Liability

Insurance with a minimum limit of \$100,000 each accident for any employee.

B. Commercial General Liability insurance with a combined single limit of \$1,000,000 each occurrence for bodily injury and property damage. The Township shall be added as "additional insured" on general liability policy with respect to the services provided under this contract.

C. Automobile Liability Insurance covering all owned, hired and non-owned vehicles with Personal Protection Insurance and Property Protection Insurance, including residual liability insurance with a minimum combined single limit of \$1,000,000 each accident for bodily injury and property damage.

D. Contractor shall furnish North Branch Area Schools with satisfactory certificates of insurance or a certified copy of the policy, if requested.

No payments will be made to the Contractor until the current certificates of insurance have been received and approved by North Branch Area Schools. If the insurance as evidenced by the certificates furnished by the Contractor expires or is canceled during the term of the contract, services and related payments will be suspended. Contractor shall furnish North Branch Area Schools with certification of insurance evidencing such coverage and endorsements at least ten (10) working days prior to the commencement of services under this contract and shall provide for 30-day written notice to the Certificate holder of cancellation of coverage.

5. Warranty North Branch Area Schools requires a one-year warranty on labor.

6. Compliance with Laws and Regulations

The Contractor will comply with all federal, state and local regulations, including but not limited to all applicable OSHA requirements and the Americans with Disabilities Act.

7. Interest of Contractor and North Branch Area Schools

The Contractor promises that it has no interest which would conflict with the performance or services required by this contract. The Contractor also promises that in the performance of this contract, no officer, agent, employee of North Branch Area Schools or member of its governing body, may participate in any decision relating to this contract which affects his/her personal interest or the interest of any corporation, partnership or association in which he/she is directly or indirectly interested or has any personal or pecuniary interest.

8. Equal Employment Opportunity

The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, sex, sexual orientation, national origin, physical handicap, age, height, weight, marital status, veteran status, religion and political belief (except as it relates to a bona fide occupational qualification reasonably necessary to the normal operation of the business).

9. Payroll Taxes

The Contractor is responsible for all applicable state and federal social security benefits and unemployment taxes and agrees to indemnify and protect North Branch Area Schools against such liability.

V. TERMS AND CONDITIONS

1. Award:

North Branch Area Schools reserves the right to reject any and all bids received as a result of this RFB.

2. Low Bid: A successful contract will be awarded by the response given on the Bid Sheet to the most responsive and responsible respondent.

3. Term of Bid:

The Bid is for a six (6) month period from the date of award.

4. Bid Submission:

Submit Bid Cover page, Bid Signature Page, Contractor Information (page 2, II) and Bid Security/Performance Bond by required time/date. Bids must be submitted by mail or hand delivered to North Branch Area Schools Central Office at 6655 Jefferson St, North Branch MI 48461 by 2:00pm on January 3, 2024.

Mailing address is P.O. Box 3620, North Branch, MI 48461

5. Questions:

Submit all project questions to Owner's Representative: Jeff Drayton, Director of Operations, 810-688-3570 ext 2708, jdrayton@nbbroncos.net

VI. PROPOSAL FORM/ALL TRADES

PROJECT:

North Branch Area Schools Maintenance Storage Building Addition

Name of Contractor

Address, City, Zip

Phone #/Fax #

Email Address

PROPOSAL

Pursuant to and in compliance with the Invitation to Bid and the Instructions to Bidders, and having carefully examined the Bidding Documents with the Owner to complete the work in accordance with the said Bidding Documents for the sum of:

(Sum to be written out)

Dollar \$

Anticipated Completion Date: _____

BREAKDOWN OF BASE PROPOSAL:

SITE WORK	\$
FOUNDATIONS	\$
CONCRETE FLAT WORK	\$
ROUGH CARPENTRY	\$
INTERIOR CARPENTRY	\$
DOORS AND HARDWARE	\$
ROOFING	\$
ELECTRICAL	\$
GENERAL CONDITIONS	\$
OVERHEAD & PROFIT	\$

BASE PROPOSAL BID

\$

ALTERNATES

The undersigned further proposes to execute the work specified in the respective technical division or indicated on the drawings for the sum added to the base proposal as stated below:

VOLUNTARY ALTERNATES

The following voluntary alternates are offered by the bidder. The undersigned agrees the amounts indicated below shall be added to or deducted from the Base Bid, as the case may be, for each alternate which is accepted.

	<u>Description of Voluntary Alternates</u>	<u>Add</u>	<u>Deduct</u>
1.	_____	_____	_____
2.	_____	_____	_____
3.	_____	_____	_____
4.	_____	_____	_____

SPECIAL PROVISIONS
North Branch Area Schools
Maintenance Storage Building Addition

SECTION 1: SCOPE OF WORK

Work scope: The work includes, but is not limited to construction of an addition to the existing maintenance storage building located adjacent to the football field at North Branch Area Schools, which includes grading, construction and electrical along with all appurtenant work necessary to complete the project as stated in the plans and bid specifications.

SECTION 2: NOTICE TO PROCEED AND TIME SCHEDULE

An official "Notice to Proceed" specifying the date by which construction operations shall be started will be issued in writing and delivered to the CONTRACTOR by North Branch Area Schools upon approval by the North Branch Area Schools School Board and when all appropriate bonds and contracts have been signed and returned to North Branch Area Schools. Contract time will begin on the date specified in the "Notice to Proceed", unless operations begin at an earlier date, in which case the date that such operations begin will apply. The CONTRACTOR shall immediately begin and diligently prosecute the work to completion. The CONTRACTOR shall obligate himself to complete the work within the stated time limits. The CONTRACTOR shall begin work and shall diligently prosecute same to completion of the work from the date of commencement order, without fail and in the manner as stated in said specifications. All work described in this document shall be completed by April 30, 2024.

SECTION 3: EXCUSABLE DELAYS

The Contractor shall not be assessed with liquidated damage nor the cost of engineering inspection during any delay in the completion of the work caused by acts of God, the public enemy, fire, floods, epidemics, quarantine restrictions, strikes, freight embargoes, unusually severe weather, or due to such causes, provided that the Contractor shall within ten (10) days from the beginning of such delay notify the Project Manager in writing of the causes of delay. The Project Manager's findings of the facts thereon shall be final and conclusive.

SECTION 4: INTENT OF THE PLANS AND SPECIFICATIONS

The intent of the plans and specifications is to prescribe a complete outline of work which the Contractor undertakes to do in full compliance with the contract.

He shall furnish all required materials, equipment, tools, labor and incidentals, unless otherwise provided in the contract and shall include the cost of these items in the contract unit prices for the several units of work. All items of work called for on the plans or in the specifications and not included as a separate item in the proposal shall be considered as incidental to the other items listed in the proposal and the payment for such incidental items shall be considered as included in the contract bid.

SECTION 5: AUTHORITY OF THE PROJECT MANAGER AND INSPECTOR

All work shall be done under the supervision of North Branch Area Schools Facilities Manager acting on behalf of North Branch Area Schools. He shall decide all questions which arise as to the quality and acceptability of materials furnished, work performed, manner of performance, rates of progress, interpretation of the plans and specifications, acceptable fulfillment of the contract and compensation under the specifications. He shall determine the amount of work performed and materials furnished and his decision and estimate shall be final. His estimate shall be "condition precedent" to the right of the Contractor to receive money due him under the contract.

SECTION 6: CHANGE ORDERS

North Branch Area Schools reserves the right to make alterations or supplements to the Contract. Change Order Forms are required for all changes in decreases and/or increases of quantities and/or dollar amount changes

SECTION 7: COOPERATION WITH OTHER CONTRACTORS

The Contractor shall cooperate with other Contractors who may be employed North Branch Area Schools on construction of other work adjacent to or in the proximity of the location of the project.

SECTION 8: CONTRACTOR AND SUBCONTRACTOR RESPONSIBILITY, QUALIFICATIONS, AND LICENSE.

The Contractor and Subcontractors shall hold current licenses from the State Of Michigan. Licenses.

SPECIFICATIONS

SECTION 00010 - PROJECT SPECIFICATIONS INDEX

DIVISION 1 GENERAL REQUIREMENTS

- 011000 Summary
- 012100 Allowances
- 012600 Contract Modifications
- 012900 Payment Procedures
- 013100 Project Management
- 013200 Construction Progress Docs
- 013300 Submittal Procedures
- 015000 Temporary Facilities
- 016000 Product Requirements
- 017300 Execution
- 017700 Closeout Procedures
- 017823 Operation and
Maintenance
- 017839 Project Record
Documents

DIVISION 2 SITEWORK

Not Used

DIVISION 3 CONCRETE

- 031000 Concrete Formwork
- 032000 Concrete Reinforcement
- 033000 Cast-in-Place Concrete
- 033450 Concrete Finishing

DIVISION 4 MASONRY

Not Used

DIVISION 5 METALS

Not Used

DIVISION 6 WOOD AND PLASTICS

- 061000 Rough Carpentry
- 061900 Wood Trusses

DIVISION 7 THERMAL AND MOISTURE PROTECTION

- 074113 Metal Roof Panels
- 079200 Joint Sealants

DIVISION 8 DOORS AND WINDOWS

- 081113 Hollow Metal Doors and
Frames 083113 Access Door and
Frames 087100 Door Hardware

DIVISION 9 FINISHES

Not Used

DIVISION 10	SPECIALTIES Not Used
DIVISION 11 Not Used	EQUIPMENT
DIVISION 12 Not Used	FURNISHINGS
DIVISION 13 Not used	SPECIAL CONSTRUCTION
DIVISION 14 Not used	CONVEYING SYSTEMS
DIVISION 22	PLUMBING Not Used
DIVISION 23	MECHANICAL Not Used
DIVISION 26 See Drawings	ELECTRICAL
DIVISION 31 312001	EARTHWORK Structural Earthwork
DIVISION 32	EXTERIOR IMPROVEMENTS See Civil Drawings

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Access to site.
 - 4. Coordination with occupants.
 - 5. Work restrictions.
 - 6. Specification and drawing conventions.
- B. Related Requirements:
 - 1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 PROJECT INFORMATION

- A. Project Identification: North Branch Area School District maintenance storage building addition
 - 1. Project Location: 6598 Brush St, North Branch, MI 48461.
- B. Owner: North Branch Area School District.
 - 1. Owner's Representative: Jeff Drayton, Director of Operations, 810-688-3570 ext 2708, jdrayton@nbbronzos.net
- C. Architect: Creekwood Architecture, Inc., 1111 Creekwood Tr., Burton, MI 48509
 - 1. Jeffrey J Van Camp, AIA; 810-742-0480; jvancamp@creekwoodarch.com

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of, but is not limited to the following:
 - 1. 1,620 square foot Storage building addition to existing pole structure

B. Type of Contract:

1. Project will be constructed under a single contract.

1.5 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to area of work as shown on drawings.
2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 COORDINATION WITH OCCUPANTS

A. Full Owner Occupancy: Owner will occupy site and existing facilities during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.7 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. On-Site Work Hours: Limit on site to normal business working hours of 7:00 a.m. to 7:00 p.m., Monday through Saturday, unless otherwise indicated.

1. Weekend Hours/Holidays: Weekend work not allowed on Sunday. Work not allowed on Holidays recognized by the City of Sparks.

C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Owner not less than two days in advance of proposed utility interruptions
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
1. Notify Owner not less than two days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.

1.8 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012100 – NOT USED

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.3 MINOR CHANGES IN THE WORK

- A. Owners Representative will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Owners Representative's Supplemental Instructions."

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Owners Representative will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Owners Representative are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Owners Representative.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owners Representative.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

6. Proposal Request Form: Use form acceptable to Owners Representative.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.6 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Changes Proposal Request, Owners Representative will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Owners Representative may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not

Used) PART 3 -

EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012100 "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Owners Representative at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Contractor's name and address.
 - c. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.

3) Equipment.

4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance.
7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Owners Representative and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Owners Representative by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
 1. Submit draft copy of Application for Payment seven days prior to due date for review by Owners Representative.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owners Representative will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do

- not include overhead and profit on stored materials.
- 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Owners Representative by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
 - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. List of Contractor's staff assignments.
 - 5. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 6. Certificates of insurance and insurance policies.
 - 7. Performance and payment bonds.
 - 8. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After Owners Representative issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited to, the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. Evidence that claims have been settled.
 - 5. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Requests for Information (RFIs).
- B. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field- engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. RFI: Request from Owner, Owners Representative, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1.5 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Owners Representative will return RFIs submitted to Owners Representative by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Owners Representative.
 6. RFI number, numbered sequentially.
 7. RFI subject.
 8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Owners Representative 's Action: Owners Representative will review each RFI, determine action required, and respond. Allow seven working days for Owners Representative 's response for each RFI. RFIs received by Owners Representative after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Owners Representative 's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Owners Representative 's action may include a request for additional information, in which case Owners Representative 's time for response will date from time of receipt of additional information.
 3. Owners Representative 's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Owners Representative in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Software log with not less than the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Owners Representative.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.

6. Date the RFI was submitted.
 7. Date Owners Representative 's response was received.
- F. On receipt of Owners Representative 's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Owners Representative within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not

Used) PART 3 -

EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's construction schedule.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting schedules and reports.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Owners Representative.
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than 7 days for startup and testing.
 - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Owners Representative's administrative procedures necessary for certification of Substantial Completion.
 - 6. Punch List and Final Completion: Include not more than 14 days for completion of punch list items and final completion.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. As the Work progresses, indicate final completion percentage for each activity
- B. Distribution: Distribute copies of approved schedule to Owners Representative Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 3. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 4. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Owners Representative's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 ACTION SUBMITTALS

- A. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Owners Representative and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Owners Representative 's final release or approval.
 - g. Scheduled date of fabrication.
 - h. Scheduled dates for purchasing.
 - i. Scheduled dates for installation.
 - j. Activity or event number.

1.5 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Owners Representative 's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Owners Representative for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Owners Representative reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Owners Representative 's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owners Representative will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Owners Representative 's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.

- D. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
 - 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number (e.g., LNHS-061000.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., LNHS-061000.01.A).
 - 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Owners Representative.
 - 4. Transmittal Form for Electronic Submittals: Use electronic form acceptable to Owner, containing the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Owners Representative.
 - d. Name of Contractor.
 - e. Name of firm or entity that prepared submittal.
 - f. Names of subcontractor, manufacturer, and supplier.
 - g. Category and type of submittal.
 - h. Submittal purpose and description.
 - i. Specification Section number and title.
 - j. Specification paragraph number or drawing designation and generic name for each of multiple items.
 - k. Drawing number and detail references, as appropriate.
 - l. Location(s) where product is to be installed, as appropriate.
 - m. Related physical samples submitted directly.
 - n. Indication of full or partial submittal.
 - o. Transmittal number-numbered consecutively.
- E. Options: Identify options requiring selection by Owners Representative.
- F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Owners Representative on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Owners Representative 's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Owners Representative 's action stamp.

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Submit electronic submittals via email as PDF electronic files.
 - a. Owners Representative will return annotated file. Annotate and retain

- one copy of file as an electronic Project record document file.
 - b. Standard color charts.
 - c. Statement of compliance with specified referenced standards.
 - d. PDF electronic file.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Notation of coordination requirements.
 - d. Notation of dimensions established by field measurement.
 - e. Relationship and attachment to adjoining construction clearly indicated.
 - f. Seal and signature of professional engineer if specified.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches , but no larger than 30 by 42 inches .
 - 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
- C. Contractor's Construction Schedule: Comply with requirements specified in Section 013200 "Construction Progress Documentation."
- D. Application for Payment and Schedule of Values: Comply with requirements specified in Section 012900 "Payment Procedures."

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owners Representative.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 Owners Representative 'S ACTION

- A. Informational Submittals: Owners Representative will review each submittal and will not return it, or will return it if it does not comply with requirements. Owners Representative will forward each submittal to appropriate party.
- B. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Owners Representative.
- C. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- D. Submittals not required by the Contract Documents may be returned by the Owners Representative without action.

END OF SECTION 013300

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for limits on use of Project site.
 - 2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
 - 3. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.4 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Irrigation Control systems.
 - b. Underground Communication systems.
 - c. Underground Electrical wiring systems.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Owners Representative for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Owners Representative according to requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Owners Representative promptly.
- B. General: Lay out the Work using accepted surveying practices.
 - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 - 2. Establish limits on use of Project site.
 - 3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
 - 4. Inform installers of lines and levels to which they must comply.
 - 5. Check the location, level and plumb, of every major element as the Work progresses.
 - 6. Notify Owners Representative when deviations from required lines and levels exceed allowable tolerances.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading,

fill and topsoil placement, utility slopes, and rim and invert elevations.

- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Owners Representative. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Owners Representative before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Owners Representative.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
 - B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
 - C. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 011000 "Summary."
 - D. Existing Utility Services and Control/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
 - E. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
 - F. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.
- 3.7 PROGRESS CLEANING
- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - B. Site: Maintain Project site free of waste materials and debris.
 - C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
 - D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
 - E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
 - F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
 - G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
 - I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
 - J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.
- 3.8 STARTING AND ADJUSTING
- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
 - B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
 - C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- 3.9 PROTECTION OF INSTALLED CONSTRUCTION
- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
 - B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for progress cleaning of Project site.
 - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit test/adjust/balance records.
 - 5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
 - 5. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 6. Complete final cleaning requirements, including touchup painting.
 - 7. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a

minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owners Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owners Representative will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Owners Representative, that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:

1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Owners Representative's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Owners Representative. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Owners Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Owners Representative will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Owners Representative.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the following format:
 - a. PDF electronic file. Owners Representative will return annotated file.

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Owners Representative for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - c. Remove snow and ice to provide safe access to building.
 - d. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - e. Sweep concrete floors broom clean in unoccupied spaces.
 - f. Remove labels that are not permanent.
 - g. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - h. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - i. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - j. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - k. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - l. Leave Project clean and ready for occupancy.

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 017700

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
- B. Related Requirements:
 - 1. Section 017300 "Execution" for final property survey.
 - 2. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 3. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.
 - a. Owners Representative will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
- B. Record Specifications: Submit one paper copy of Project's Specifications, including addenda and contract modifications.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Owners Representative 's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.

4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Owners Representative.
 - e. Name of Contractor.
- 2.2 RECORD SPECIFICATIONS
- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
- B. Format: Submit record Specifications as paper copy.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

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

END OF SECTION 017839

SECTION 031000 - CONCRETE

FORMWORK PART 1 - GENERAL

1.1 DESCRIPTION

- A. General Requirements:
 - 1. Drawings and general provisions of the Contract Documents including General, Special and other Conditions and Division 01, "General Requirements" Sections, apply to the work specified in this Section.
- B. General Scope of Work:
 - 1. Provide formwork and accessories in accordance with provisions of this Section for cast-in-place concrete shown on the Drawings or required by other Sections of these Specifications.
- C. Related work:
 - 1. Section 032000: Concrete reinforcement.
 - 2. Section 033000: Cast-in-place concrete.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Design of formwork is the Contractor's responsibility.
- C. Standards:
 - 1. Concrete work shall comply with the requirements of ACI 301, "Specifications for Structural Concrete for Buildings", latest edition.
 - 2. Items not otherwise specified shall comply with ACI Standard 347, "Recommended Practice for Concrete Formwork", latest edition.
- D. Allowable Tolerances in Formwork:
 - 1. Construct formwork to provide completed cast-in-place concrete surfaces complying with the tolerances specified in ACI 347.
 - 2. Before concrete placement, check the lines and levels of erected formwork. Make corrections and adjustments to ensure proper size and location of concrete members and stability of forming systems.
 - 3. During concrete placement, check formwork and related supports to ensure that forms are not displaced and that completed work will be within specified tolerances.
 - 4. Refer to Structural Drawings for additional requirements.

1.3 SUBMITTALS

- A. Submit manufacturer's specifications and installation instructions for products specified. Include manufacturer's certification as may be required to show compliance with these specifications.

1.4 JOB CONDITIONS

- A. LOADING STRUCTURES
 - 1. Protect all in-place structures from excessive loading.
 - 2. Shore and brace as necessary to prevent all damage.
- B. SCHEDULING
 - 1. Contractor shall provide and erect sufficient forms so that the work of placing concrete will proceed at a rate to insure maintaining a schedule so that the time of the inspector shall be as continuous as practicable.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. GENERAL
 - 1. Except for metal forms, use new materials. Materials may be re-used during

progress of the Work, provided they are completely cleaned and reconditioned, recoated for each use, and capable of producing formwork of the required quality.

B. EARTH FORMS

1. Posthole footing may be placed directly against excavation per drawings

C. FORM MATERIALS

1. Lumber for Forms:

- a. For concealed concrete surfaces including footings and foundations, use "Standard" or better grade Douglas Fir, T&G or shiplap, surface 1 side, 2 edges, not wider than 8", secured to wood or steel stakes, substantially constructed to shapes indicated and to support the required loads.
- b. For studs, wales, and supports, use S4S surfaced "Standard" or better grade Douglas Fir lumber, dimensions as required to support the loads, but not less than 2x4 inch size.

2. Flat Steel Forms:

- a. Approved type steel forms may be used in lieu of wood and plywood, at the Contractor's option.

3. Tube Forms:

- a. For round columns furnish fiber, fiberglass, or metal tube forms of diameters required, capable of withstanding continuous pour full height and providing a finished surface free of spiral markings.

4. Control Joints:

- a. For interior slabs, where not otherwise provided by saw cutting, furnish Greenstreak Plastic Products "Zipcap Control-joint Former", or approved, minimum 10-foot lengths, 1" depth for installation in new interior slabs.

5. Expansion Joints:

- a. For Interior Slabs: Meadows "Seal Tight" self-expanding cork, 1/2" thick by depth of slab less 1/4", conforming to ASTM D1752, Type 3 (AASHTO M153-Type II), or approved equal.

6. Joint Sealant:

- a. As specified in Section 033000.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.
- B. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Install concrete work in accordance with ACI 301 except as amended by this Section.

B. Earth Forms:

1. Where permitted, hand trim sides and bottom of earth forms. Remove loose soil prior to placing concrete.

C. Construction - Formwork:

- a. Keep forms moist prior to pour to prevent shrinkage and warping.
- b. Do not damage concrete during stripping. Permit removal of remaining principal shores.

1. Fabrication:

- a. Fabricate forms for easy removal without hammering or prying against concrete surfaces.
- b. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces.

2. Corner treatment:

- a. Chamfer salient corners in exposed concrete unless otherwise noted or where flush with adjacent surfaces. Unless shown otherwise, form chamfers

- with 3/4" x 3/4" strips, accurately formed and surfaced to produce uniformly straight lines and tight edges.
 - b. Extend terminal edges to required limit, and miter the chamfer strips at changes in direction.
- 3. Provisions for Other Trades:
 - a. Provide openings in concrete formwork to accommodate work of other trades.
 - b. Verify size and location of openings, recesses, and chases with the trade requiring such items.
 - c. Accurately place and securely support items to be built into the concrete.
- D. TREATMENT OF FORMS
 - 1. Before placing the concrete, the contact surfaces of forms shall be coated with a suitable non-staining form coating compound or shall be given two coats of nitrocellulose lacquer. Mineral oil shall not be used on forms.
 - 7. Excess coating shall be removed by wiping with cloths. Re-used forms shall have the contact surfaces cleaned thoroughly, those which have been coated shall be given an additional application of the coating.
- E. JOINTS AND STOPPAGES
 - 1. Expansion Joints:
 - a. Do not extend reinforcement trough where bonded on both sides of joint; smooth dowels may extend through joint. Position accurately and support against displacement in locations listed hereinafter.
 - b. Interior Work:
 - i. Install isolation/expansion joints between interior ground-supported slabs and building foundation walls when shown on Drawings, and at other locations where specifically shown or noted.
 - c. Exterior Work:
 - i. Install as required in new walks and slabs in locations and/or spacings shown, elsewhere not more than 10 feet apart. Coordinate exact locations and alignment with Owners Representative.
 - ii. Install expansion joints between concrete walks/slabs and vertical building walls and retaining walls.
 - 2. Control Joints:
 - a. Provide as detailed and in locations indicated, accurately placed to true straight lines and supported against displacement.
 - b. For exterior work, form with edging tool as specified in Section 033000.
 - c. For interior work, build control strips into forms or diamond-saw cut joints 1/8" wide by 1/5 the depth of the slab.
 - i. If sawing method is used, sawing shall be performed as soon as the concrete hardens sufficiently to prevent raveling of the concrete at the edges and before the concrete temperature is permitted to fall; perform cuts 4 – 8 hours after concrete is placed, as soon as the freshly placed concrete can be walked on.
- F. REMOVING FORMS AND SHORING
 - 1. Forms:
 - a. Remove only after concrete has thoroughly hardened. Vertical forms may be removed 24 hours after pour where structure is supported on shores. Remove other forms no sooner than 7 days.
 - 2. Finished Surfaces:
 - a. Exercise care in removing forms from finished concrete surfaces so that surfaces are not marred or gouged, and that corners are true, sharp, and unbroken.
 - b. Release sleeve nuts or clamps, and pull the form ties neatly.
- 3.3 FIELD QUALITY CONTROL
 - A. INSPECTIONS
 - 1. Testing will be performed as required by the International Building Code, as adopted by local jurisdiction, and these Specifications.

END OF SECTION 031000

SECTION 032000 - CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Drawings and general provisions of The Contract Documents including General, Supplemental and other Conditions and Division 01, "General Requirements" Sections, apply to the work specified in this Section.
- B. Related work:
 - 1. Section 031000: Concrete formwork.
 - 2. Section 033000: Cast-in-place concrete.
 - 3. Section 042200: Unit Masonry.

1.2 QUALITY ASSURANCE

- A. Comply with the pertinent provisions of the latest edition of the following, except as may be modified herein.
 - 1. ACI 318 "Building Code Requirements for Reinforced Concrete", hereinafter called "ACI 318".
 - 2. ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures", hereinafter called "ACI 315".
 - 3. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice".
- B. Inspections: Drawings and general provisions of the Contract Documents including General, Supplemental and other Conditions and Division 1.
- C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. WELDED STEEL WIRE FABRIC
 - 1. Furnish welded wire fabric meeting requirements set forth in ASTM A185 and A82, $F_y=65$ ksi.
- B. FIBROUS SECONDARY REINFORCEMENT
 - 1. General:
 - a. Use in all standard weight concrete mixes for interior and exterior slabs on grade.
 - b. Acceptable fibrous secondary reinforcement for slabs shall be polypropylene fiber which is inert to alkali and chemical attack; fiberglass fibers are not acceptable.
 - 2. Length:
 - a. As recommended by fibrous reinforcing manufacturer; ranging between $\frac{1}{2}$ " to $\frac{3}{4}$ ".
 - 3. Acceptable Products/Manufacturers:
 - a. "Nycon" as manufactured by Nycon Inc.
 - b. "Fibermesh" as manufactured by Fibermesh Co.
 - c. "Microfiber" as manufactured by W. R. Grace.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

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

3.2 INSTALLATION

A. Cleaning Reinforcement:

1. Clean reinforcement, at time concrete is placed, free of mud, oil, or other materials that will reduce the bond. Conform to ACI 318.

B. Placing & Fastening Reinforcement:

C. PLACING WELDED WIRE FABRIC

1. Install in all concrete slabs on grade, except slabs where bar reinforcing is indicated; provide sizes specified herein or otherwise indicated, and with minimum coverages indicated for concrete protection.
2. Install welded wire fabric in as long lengths as practicable.
3. Lap adjoining pieces at least 12" or one full mesh spacing plus 2", whichever is greater, and lace splices with 16 gauge wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.
4. Do not carry through expansion joints.

D. FIBROUS SECONDARY REINFORCEMENT

1. For all standard weight slabs on grade add fibrous reinforcing to concrete mix at the batch plant, at manufacturer's recommended rate per cubic yard of standard weight and lightweight concrete mixes, and in strict accordance with fiber manufacturer's printed instructions.

END OF SECTION 032000

SECTION 033000 - CAST-IN-PLACE

CONCRETE PART 1 - GENERAL

1.1 DESCRIPTION

- A. WORK INCLUDED: Drawings and general provisions of the Contract Documents including General, Supplementary and other Conditions and Division 1, "General Requirements" Sections, apply to the work specified in this Section.
- B. RELATED WORK
 - 1. Section 031000: Concrete formwork.
 - 2. Section 032000: Concrete reinforcement.
 - 3. Section 033450: Concrete finishing.
- C. COORDINATION
 - 1. Coordinate all installation under this Section with work of other trades.

1.2 QUALITY ASSURANCE

- A. GENERAL
 - 1. Concrete shall conform to all provisions of the latest edition of the (ASTM) American Society for Testing and Materials and the (ACI) American Concrete Institute noted within this specification, except as modified by the Supplemental Requirements contained herein.
 - 2. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
 - 3. Preinstallation (or Preconstruction) Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination".
- B. STANDARD SPECIFICATIONS
 - 1. Conform to ACI Specifications for Structural Concrete for Buildings (ACI 301) hereinafter called "ACI 301".
 - 2. Conform to ACI 302 "Guide for Concrete Floor and Slab Construction".
 - 3. Conform to ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete".
 - 4. Conform to ACI 306R "Recommended Practice for Cold Weather Concreting"; conform to ACI 305R "Recommended Practice for Hot Weather Concreting".
 - 5. Conform to ACI 308 "Standard Practice for Curing Concrete".
 - 6. Conform to ACI 318 "Building Code Requirements for Reinforced Concrete".
 - 7. Unless otherwise shown or specified, design, construct, erect, maintain, and remove forms and related structures for cast-in-place concrete work in compliance with the American Concrete Institute Standard ACI 347, "Recommended Practice for Concrete Formwork".
 - 8. Conform to ASTM C979 "Pigments for Integrally Colored Concrete".
- C. QUALITY CONTROL
 - 1. Do not commence placement of concrete until mix designs have been reviewed and approved by the Owners Representative and all governmental agencies having jurisdiction, and until copies are at the job site, and the batch plant.

1.3 SUBMITTALS

- A. SUBMIT
 - 1. Submit list of all items proposed to be provided under this Section together with manufacturer's product data and installation instructions for all such proprietary materials.
 - 2. Submit product data and manufacturer's instructions for all required products.
- B. Provide the following submittals in accordance with ACI-301:
 - 1. Admixture certification. Chloride ion content must be included.
 - 2. Aggregate certification.
 - 3. Concrete mix design. Submit a mix design for each strength and type of concrete. Clearly indicate where each mix design will be used.
 - 4. Construction and control joints not shown on drawings.
 - 5. Materials and methods for curing (per Section 033450).
 - 6. Laboratory tests on concrete.

1.4 JOB CONDITIONS

- A. WINTER CONCRETING
 - 1. Provide adequate equipment for heating materials and protecting concrete during freezing or near-freezing weather.
 - 2. Keep all materials, reinforcement, forms, and ground in contact with concrete, free from frost; use no materials containing ice.
- B. HOT WEATHER CONCRETING
 - 1. Take steps to reduce concrete temperature and water evaporation by proper attention to ingredients, production methods, handling, placing, protecting and curing.
- C. LOADING STRUCTURES
 - 1. Protect all in-place structures from excessive loading. Shore and brace as necessary to prevent all damage.
- D. FIELD REFERENCE MANUAL
 - 1. A copy of ACI SP-15 "Field Reference Manual" which includes ACI 301 shall be kept in the Contractor's Field Office at all times..

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Provide in accordance with Section 031000 for all work of this Section.

2.2 CONCRETE MATERIALS PORTLAND CEMENT

- A. 1. Provide a standard brand of Portland cement complying with ASTM C150, Type II, low

alkali. Do not change the brand of cement during progress of the Work except as approved in writing by the Owners Representative.

E. AGGREGATE

- 1. General
 - a. Provide hardrock aggregate complying with ASTM C33, with additional attributes specified herein.
 - b. For making grading tests of fine and coarse aggregate, use square mesh wire cloth complying with ASTM E11.
- 2. Fine aggregate
 - a. Provide washed natural sand having strong, hard, durable particles, and containing not more than 2% by weight of deleterious matter such as clay lumps, mica, shale, or schist.
 - b. Grade from coarse to fine within the following limits:

Sieve	Percentage by weight passing sieve:		
size:	Minimum:	Maximum:	
3/8"	100	---	
No. 4	95	100	
No. 8	65	95	
No. 16	45	75	
No. 30	30	50	
No. 50	10	22	
No. 100	2	8	

- 3. Coarse aggregate
 - a. Provide coarse aggregate consisting of clean, hard, fine grained, sound crushed rock or washed gravel, or a combination of both, containing not more than 5% by weight of flat, chip-like, thin, elongated, friable, or laminated

pieces, nor more than 2% by weight of shale or cherty material. Any piece having a length in excess of five times the average thickness shall be considered flat or elongated.

- b. Use coarse aggregate of the largest practicable size for each condition of placement, subject to the following maximum size limitations: Do not exceed 3/4 of the clear distance between reinforcing bars 1/5 of the narrowest dimension between sides of forms, or 1/3 the depth of any slab section.
- c. Grade combined aggregates within the following limits:

Sieve size or size in inches	Percentage by weight passing sieve:					
	1-1/2" aggregate:		1" aggregate:		3/4" aggregate:	
	Min:	Max:	Min:	Max:	Min:	Max:
1-1/2"	95	---	---	---	---	---
1"	75	90	90	100	---	---
3/4"	55	77	70	90	90	100
3/8"	40	55	45	65	60	80
No. 4	30	45	31	47	40	60
No. 8	22	35	23	40	30	45
No. 16	16	30	17	35	20	35
No. 30	10	20	10	23	13	23
No. 50	2	8	2	10	5	15
No. 100	0	3	0	3	0	5

F. WATER

1. Use only water which is clean and free from deleterious amounts of acid, alkali, salt, and organic materials.

2.2 ADMIXTURES

A. Use only standard brands of admixtures for concrete, approved by the Owners Representative, meeting or exceeding the following requirements.

1. Air entraining admixtures shall conform to "Specifications for air-entraining admixtures for Concrete" ASTM C-260.
2. Water Reducing Admixture: "Eucon WR-75" by The Euclid Chemical Co., "Pozzolith 200N" by Master Builders, "Plastocrete 161" by Sika Corporation, and WRDA-64 by W.R. Grace. The admixture shall conform to ASTM C-494, Type A and not contain more chloride ions than are present in municipal drinking water.
3. Water Reducing, Retarding Admixture: "Eucon Retarder-75" by The Euclid Chemical Co., "Pozzolith 100XR" by Master Builders, DARATARD-17 by W.R. Grace, or "Plastocrete 161MR" by Sika Corporation. The admixture shall conform to ASTM C- 494, Type D and not contain more chloride ions than are present in municipal drinking water.
4. Mid-Range Water Reducing Admixture: "Daracem-55" as manufactured by W.R. Grace, Sikament HP" as manufactured by Sika Corporation, or approved equal. The admixture shall not contain calcium chloride, and shall conform to ASTM C-494, Type A.
5. High Range Water Reducing/Retarding Admixture (Superplasticizer): "ECON 537" by The Euclid Chemical Co., DARACEM 100 by W.R. Grace, or "Sikament 320" by Sika Corporation. Admixture shall conform to ASTM C-494, Type G, and not contain more chloride ions than are present in municipal drinking water.
6. High Range Water Reducing Admixture (Superplasticizer): "Eucon 37" by The Euclid Chemical Co., WRDA-19 by W.R. Grace, or "Sikament 86" by Sika Corporation. The admixture shall conform to ASTM C-494, Type F, and not contain more chloride ions than are present in municipal drinking water.
7. Non-Corrosive, Non-Chloride Accelerator: "Accelguard 80" by The Euclid Chemical Co., DARASET by W.R. Grace, "Plastocrete 161FL" by Sika Corporation, or approved equal. The admixture shall conform to ASTM C-494, Type C or E, and not contain more chloride ions than are present in municipal

drinking water.

8. Concrete Corrosion Inhibitor: DCI Corrosion Inhibitor by W.R. Grace & Co., "Armatec 2000" by Sika Corporation or approved equal. The admixture shall conform to ASTM C- 494 Type C. When this is specifically noted to be used, it shall be used at a dosage rate of 2 gallons per cubic yard (Armatec 2000 by Sika Corporation at 1/2 gallon per cubic yard).
9. Prohibited Admixtures: Calcium chloride, thiocyanates or admixtures containing more than 0.05% ions by weight of cement are not permitted.

2.3 ACCESSORY MATERIALS

- A. Expansion joint filler: Provide preformed strips, non-extruding and resilient bituminous type, of thickness indicated, complying with ASTM D1751, ("Fibre Expansion Joint" by W.R. Meadows or approved equal).
- B. Bonding Materials: The compound shall be a polyvinyl acetate, rewettable type, "Euco Weld" by The Euclid Chemical Company or "Weld-crete" by The Larsen Company. Use only in areas not subject to moisture.
- C. Bonding Admixture: The compound shall be a latex, non-wettable type, "SBR Latex" or "Flex- Con" by The Euclid Chemical Company, or "Daraweld C" by W.R. Grace.
- D. Structural Bonding Epoxy Adhesive: The compound shall meet ASTM C-881 and shall be a two (2) component, 100% solids, 100% reactive compound suitable for use on dry or damp surfaces, "Euco Epoxy #452 MV or #620" by The Euclid Chemical Company, "Sikadur Hi-Mod or Sikadur 32 Hi-Mod LPL" by Sika Chemical Corporation.
- E. Epoxy Joint Filler: Shall be a multi component, 100% solids compound with a minimum shore D hardness of 50, "Euco Epoxy #700" by The Euclid Chemical Company or "Sikadur 51 NS/SL" by Sika Chemical Corporation. When and where this is specifically noted to be used, this shall be applied as late as possible after the concrete floor slab is poured, preferably at least 6 months, but not earlier than 2 months after the concrete floor slab is poured. Use in all interior slab joint locations, where concrete slab is to be left exposed.
- F. Evaporation Retarder: The compound shall be "SikaFilm" by Sika Corporation, "Confilm" by Master Builders, or "Eucobar" by Euclid Chemical Company.
- G. Joint Sealant: Shall be "Eucolastic 1SL" by The Euclid Chemical Company, or "SikaFlex la" by Sika Corporation. The sealant shall be a one part urethane sealant requiring no primer and conforming to ASTM C-920, Type S, grade NS., class 25. Use in exterior slab joint locations, where specifically noted.
- H. Concrete Fibers: Concrete fibers for all designated areas shall be 100% virgin polypropylene material. Fibers shall be 1/2" or 3/4" in length such as Grace "Microfiber" by W.R. Grace, "Fibermesh" by Fibermesh Co., or approved equal. Fibers shall be used at a minimum dosage rate of 1-1/2 lbs. per cubic yard, unless otherwise specified. Grace "Microfiber" shall be used at a rate of 1 lb. per cubic yard.

2.4 EQUIPMENT FOR MIXING & PLACING

- A. CONVEYING EQUIPMENT
 1. Use crane bucket, wheelbarrow, pumps, or buggies to deliver concrete to placing location.
 2. Chuting permitted only by methods to insure a practically continuous flow of concrete at delivery and to prevent material separation.
 3. If pumping is employed, secure prior approval of equipment, procedures and mix design. No aluminum pipes or chutes will be permitted for pumping, chuting or tremie operations.
- B. COMPACTION EQUIPMENT
 1. Use internal mechanical vibrators with 7000 rpm minimum frequency.

2.5 CONCRETE MIXES

- A. Proportions for concrete mixes shall be in accordance with ACI 301. All mixes must be approved by the Owners Representative prior to use on the job. No deviations from the approved mixes will be permitted without written prior approval of the Owners Representative.
- B. Where the concrete production facility can establish the uniformity of its production

for concrete of similar strength and materials based on recent test data, the average strength used as a basis for determining mix design proportions shall exceed the specified design strength by the requirements of ACI-318 or ACI-301.

- C. When a concrete production facility does not have field test records for calculation of standard deviation, the required average strength shall be at least 1200 psi greater than the specified design strength.
- D. All concrete shall contain the specified water-reducing or water-reducing retarding admixture and/or mid-range or high-range water-reducing admixture (superplasticizer). All concrete slabs, placed at air temperatures below 40° F shall contain the specified non- corrosive non- chloride accelerator. All concrete required to be air entrained shall contain an approved air- entraining admixture. All pumped concrete, concrete for industrial slabs, Owners Representative ural concrete, concrete required to be watertight, and concrete with a water- cement ratio below 0.50 shall contain the specified high-range water-reducing admixture (superplasticizer). All concrete slabs and flatwork, both interior and exterior, shall contain the specified concrete fibers.
- E. All concrete containing the high-range water-reducing admixture (superplasticizer) shall have a maximum slump of 8" unless otherwise approved by the Owners Representative. The concrete shall arrive at the job site at a 3" max. slump, be verified, then the high-range water-reducing admixture added to increase the slump to the approved level. All other concrete shall have a maximum slump of 3" for slabs and 4" for other members. This maximum slump may not be exceeded except by the job-site addition of the specified high-range water-reducing admixture, (Superplasticizer). In those portions of the structures where member dimensions and/or congestion due to reinforcing steel prevent the proper placement and consolidation of the concrete at the maximum slump specified, superplasticizer shall be used by the Contractor in lieu of increasing the slump of non- superplasticized concrete by the addition of water.
- F. Hardrock concrete
 - 1. Achieve a weight of approximately 145 pcf and an ultimate compressive strength as listed in the following table.

Concrete Types		Req'd 28 day Compressive Strength	Maximum Water Cement Ratio	Air Content
	Location			
	Footings, and all other below grade	3000	0.50	Optional
	Interior slabs on grade, and interior walls	3500	0.50	2% ± 1%
	Concrete subjected to freezing and thawing and exterior slabs subjected to deicers	4000	0.45	6% ±

Do not retemper mix by adding water in field.

PART 3 - EXECUTION

3.1 PREPARATION

A. SURFACE CONDITIONS

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

B. CLEANING FORMS

1. Before placing concrete, clean spaces within forms of all refuse, debris and dirt. Provide cleaning holes for removal of foreign matter; after cleaning, replace forms at openings and brace to prevent form failure.

C. MIXING & PLACING

1. Conform to the requirements of ACI 301.
2. Clean free of all foreign matter and ice, all mixing and transporting equipment, subgrade and forms to receive concrete.
3. Clean reinforcement of deleterious coatings and ice.

3.2 INSTALLATION OF FORMWORK

- A. In accordance with Section 031000.

3.3 CONCRETE MIXING

- A. Concrete for minor work, when approved by the Owners Representative, may be mixed at the site in a power mixer when the mixer has a capacity not less than one full sack batch.

- B. Unless otherwise approved by the Owners Representative, use ready mixed concrete complying with ASTM C94.

1. Mixing

- a. Mix each batch of concrete not less than 15 minutes, five minutes of which shall be at the site.
- b. Rotate the drum at the rate specified by the manufacturer of the mixer as "mixing speed."
- c. Whenever there is a delay in unloading, rotate the drum slowly at intervals to prevent incipient set of concrete.

2. Addition of water:

- a. Normally, do not deliver concrete with total permissible amount of water incorporated therein.
- b. After water is added, at least five minutes of mixing time shall be immediately prior to discharge.
- c. Concrete will be rejected if not placed in final position within 1-1/2 hours after water is first added to the batch.

3. Concrete at time of placing shall be in such condition that it can be placed properly.

4. Discharge all wash water from the mixing drum before the truck reloads at the batching plant.

5. Mixing equipment shall not be charged beyond its rated capacity.

C. Concrete consistency

1. Use the amount of water established by the approved mix design.
 - a. Do not exceed the maximum quantity specified for the grade of concrete.
 - b. Use the minimum amount of water necessary to produce concrete of the workability required by the Owners Representative.
 - c. Do not supplement the predetermined amount of water with additional water for any reason.
2. Measure concrete consistency by ASTM C143 method.
3. Provide maximum slumps of concrete as follows:
 - a. Footings and slabs on soil: 3", (+1", -1").
 - b. Other concrete: 4".

3.4 CONVEYING AND PLACING CONCRETE

- A. Before placing concrete, thoroughly clean forms, wash out with water, and make tight.
- B. Preparation
 - 1. Before new concrete is deposited upon or against concrete that has taken its initial set or has hardened, remove all incrustations from forms and reinforcement.
 - 2. Remove all laitance, oil, and loose particles from concrete and concrete surfaces, and thoroughly clean the forms with water under stiff pressure.
 - 3. Remove all laitance after concrete has hardened partially (not less than two hours nor more than four hours after placing) by brushing with stiff bristles, or by directing a stream of water from a 1/4" nozzle, or by other methods approved by the Owners Representative, to expose the clean top surface of the coarse aggregate.
 - 4. Where cleaning is not satisfactory to the Owners Representative, sandblast the surface and then wash again.
- C. Method of placing
 - 1. Place concrete only under the degree of inspection described elsewhere in these Specifications, and as required by governmental agencies having jurisdiction.
 - 2. Do not place concrete outside of regular working hours unless required inspection authorities have been notified properly and are present.
 - 3. Do not permit concrete to free drop more than 4'-0".
 - 4. Deposit concrete direct into conveyances, and direct from conveyances to final points of repose, except where troughs, buckets, or the like are used, in which case dump concrete into hoppers and then into the conveyances.
 - 5. Deposit concrete so that the surface is kept level throughout, a minimum being permitted to flow from one position to another, and place as rapidly as practicable after mixing.
 - 6. Do not use in this Work any concrete not placed within 30 minutes after leaving the mixer.
- D. Tamping and conveying
 - 1. Thoroughly work concrete around reinforcement and embedded fixtures, and into corners of forms, during placing operations.
 - 2. Completely compact and vibrate all concrete including floor slabs with tamping poles, mechanical vibrators and by tapping forms until the concrete is thoroughly compact and without voids. Determine the number of tampers and vibrators needed by the amount and method of placing concrete.

3.5 STEPS, SLABS, WALK, AND PAVING ON EARTH

- A. Preparation for slabs on earth
 - 1. Prepare the subgrade and base as specified in other Sections.
 - 2. Dampen the subgrade for exterior slabs and paving if necessary prior to placing concrete.
- B. Placing and finishing
 - 1. Mechanically vibrate and then tamp the freshly placed concrete, using a heavy tamper, until at least 3/8" of mortar is brought to the surface.
 - 2. Use tampers having a face consisting essentially of a grid of parallel metal bars.
 - 3. Tamp with a light tamper, and screed with heavy straightedge, until depressions and irregularities are worked out and the surfaces are true to finish grades and elevations.
 - 4. Remove excess water and debris worked to the surface in compaction and screeding.
 - 5. Remove laitance as described previously.
 - 6. When concrete has hardened sufficiently, float to a compact and smooth surface.
- C. In Slabs-On-Grade Provide
 - 1. Contraction (control) joints in interior work.
 - a. By use of tooled control joints or at Contractor's option by sawcutting to 1/5 slab depth.
 - b. Where not otherwise shown on Drawings, provide control joints at column centerlines and/or at the following maximum spacing:
 - 4" slab max. spacing = 10 ft.
 - each way. 5" slab max. spacing = 10 ft. each way.
 - 6" slab max.

spacing = 12 ft. each way. 7"
slab max. spacing = 14 ft. each
way. 8" slab max. spacing = 14
ft. each way.

2. Joints in Exterior Work

- a. Provide contraction joints in exterior work where shown by means of 1" deep tooled joints with edges rounded and tool marks removed. If the layout of the contraction joints is not shown on the plans, then the Contractor shall submit a proposed layout to the Owners Representative for approval with joints at a maximum of 5'-0" o.c.
 3. At all construction joints of slabs on grade, discontinue slab reinforcement, and provide smooth, greased dowels.
 4. Provide isolation joints where shown at contacts between slabs and vertical surfaces. Form with 15# felt paper for interior work and expansion joint filler for exterior work.
 5. Seal exterior expansion and contraction joints where shown with the here-in specified joint sealing compound.
 6. Provide the finish surfaces shown on the Drawings or otherwise directed by the Owners Representative, in accordance with pertinent provisions of Section 033450 of these Specifications.
- D. Cure and protect concrete in accordance with pertinent provisions of Section 033450 of these Specifications, and ACI 302.

3.6 SODA AND ACID WASH

3.7 INSPECTIONS & TESTING

- A. Standard slump and cylinder samples (3) must be taken after addition of water. The method of measuring water and the person(s) authorized to add water and make samples must be mutually responsible for cost of additional sampling and testing costs related to discharging concrete in conflict with Contract Documents. All concrete requiring a slump change of more than 2", except when the HRWR admixture is being used, will be rejected.
- B. Slump and compressive strength tests: ASTM C 39 - one set for each 50 cu. yd. or fraction thereof, of each class of concrete placed in any one day or for each 5000 sq. ft. of surface area placed: one specimen tested at 7 days, one specimen tested at 28 days and one specimen retained in reserve at the laboratory for later testing if required.
- C. Determine air content of normal-weight concrete for each strength test. In addition, for all exterior flat-work concrete, determine air content per ASTM C 231-82 for each 20 cu. yd. placed.
- D. When concrete fails to meet the acceptance criteria specified in ACI-301, Section 17.2, the Owners Representative may order further testing of concrete in place in accordance with Section 17.3. When such tests are ordered, cost of testing shall be paid by the Contractor.
- E. The Contractor shall bear all cost of correcting rejected work, including the cost of the Owners Representative 's additional services thereby made necessary.

END OF SECTION 033000

SECTION 033450 - CONCRETE
FINISHING PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: Drawings and general provisions of the Contract Documents including General, Supplementary and other Conditions and Division 01, "General Requirements" Sections, apply to the work specified in this Section.
- B. Related work:
 - 1. Section 033000: Cast-in-place concrete.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. STANDARD SPECIFICATIONS
 - 1. Refer to Section 033000 for same and conform thereto as they apply to concrete curing and finishing work of this Section.
- C. DEFECTIVE WORK
 - 1. Contractor shall remove and replace at his own expense all defective work as adjudged by the Owners Representative.

1.3 SUBMITTALS

- A. Submit:
 - 1. Submit manufacturer's product data and installation instructions for proprietary materials including curing agents, sealers, hardeners, and the like.

1.4 JOB CONDITIONS

- A. Refer to Section 033000 for same and conform thereto as they apply to concrete curing and finishing work of this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Concrete materials: Comply with pertinent provisions of Section 033000, except as may be modified herein.
- B. Curing Compound for Curing Exterior Slabs:
 - 1. Furnish liquid membrane-forming curing compound conforming to ASTM C309, Type I clear. Compound shall be a clear styrene acrylate type, 30% solids content minimum, and have test data from an independent testing laboratory indicating a maximum loss of 0.030 grams per sq. cm. when applied at a coverage rate of 300 sq. ft. per gallon.
- C. Curing and Sealing Compounds Interior Slabs
 - 1. For Interior Slabs to be Left Exposed and Sealed: Furnish liquid membrane-forming acrylic polymer, water-based curing and sealing compound conforming to ASTM C1315, Type I, Class A, non-yellowing; W. R. Meadows "VOCOMP-25" or equivalent, compatible with sealer specified below.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

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

3.2 FINISHING OF FORMED SURFACES – REPAIR OF SURFACE DEFECTS

- A. General:
 - 1. After removal of forms, give the concrete surfaces one or more of the finishes specified below where so indicated on the Drawings, or directed by the Owners Representative.
- B. Formed Surfaces to be Left Exposed in the Finished Work: All exposed concrete not otherwise specified and excluding wall surfaces in mechanical rooms and the like,

shall be treated as follows:

1. Voids, Gravel Pockets and Similar:
 - a. Cut out defective areas 1" deep; vertical edges.
 - b. Wet cavities and adjacent area.
 - c. Cement mortar to match adjacent areas, use as little water as possible.
 - d. Retemper after 1 to 2 hours for shrinkage, as required.
 - e. Thoroughly fill voids and finish off, match adjacent surface in exposed work.
 - f. Finish with "Sacked Finish" as specified below.
 - g. Keep patched and finished areas damp for 7 days.

3.3 FINISHING SLABS

A. Finishing Slabs – General

1. All floor surfaces shall be within $\pm 1/2"$ of finished floor elevations designated on plans. If variations greater than this exist, the Owners Representative may direct the Contractor to grind the surfaces to bring them within the requirements. Patching of low spots shall not be permitted. Grinding shall be done as soon as possible, preferably within 3 days, but not until the concrete is sufficiently strong to prevent dislodging coarse aggregate particles.
2. Slab Curling: Acknowledging that there will be a strong possibility of having at least some slab curling at slab edges, the Contractor shall take reasonable means to keep this curling to a minimum. In the event that curling occurs to an extent and at locations which will be detrimental to the service and Architectural qualities needed for the final slab finish, the Contractor shall, at his expense, provide edge grinding or other means as necessary to bring the slab curling to a finish surface acceptable to the Owners Representative.

B. Slab Finishes

1. Unless otherwise shown, scheduled or specified hereinafter, use the following finishes, as applicable:
 - a. Furnish smooth, hard-troweled finish for all interior floors to remain as walking
 - b. Furnish smooth troweled finish for all exterior equipment pads, dumpster pads, and the like.
 - c. Furnish broomed trowel finish for all exterior walks, ramps, stairs and miscellaneous slab surfaces not otherwise specified to receive smooth trowel or exposed aggregate finishes.
 - d. Furnish "tactile" diamond pattern finish, in addition to broom finish, at handicap ramp cut slab areas indicated to receive "tactile warning surface".
 - e. Furnish "non-slip" finish for cast-in-place curbs and associated gutters, as applicable, integral with sidewalks.
2. Before finishing work begins, place, strike off, consolidate and level and/or slope, as applicable, concrete to condition ready for finishing.
3. Consolidate placed concrete preferably with power driven floats of impact type except for thin joist slabs; use wood or cork-faced hand floats for surfaces inaccessible to power floats.
4. Replace slabs with excessive shrinkage cracks and those not properly sloped and finished to floor flatness and leveling tolerances specified above, as approved, without additional cost to Owner.

C. Float Finish:

1. After the concrete has been placed, consolidated, struck off, and leveled, do not work the concrete further until ready for floating.
2. Begin floating when the water sheen has disappeared and when the surface has stiffened sufficiently to permit the operation.
3. During or after the first floating, check the planeness of the surface with a ten foot straightedge applied at not less than two different angles.
4. Cut down high spots and fill low spots.
5. Refloat the slab immediately to a uniform sandy texture.

D. Troweled Finish:

1. Provide a floated finish as described above, followed by a power troweling and then a hand troweling.
 - a. Produce an initial surface which is relatively free from defects, but which

- still may show some trowel marks.
 - b. Provide hand troweling when a ringing sound is produced as the trowel is moved over the surface.
 - c. Thoroughly consolidate the surface by hand troweling.
 - 2. Provide a finished surface essentially free from trowel marks, uniform in texture and appearance.
 - 3. On surfaces intended to support floor coverings, use grinding or other means as necessary and remove all defects of such magnitude as would show through the floor covering.
 - E. Non-Slip Finish:
 - 1. After troweling, obtain finish by dragging a strip of clean, wet burlap across the slab and curb surfaces to produce a fine, granular, or sandy textured surface without disfiguring marks.
 - 2. Round edges and joints in curbs with an edger having a radius of $\frac{1}{4}$ ".
 - F. Exterior Control Joint & Slab Edge Treatment:
 - 1. Steel tool all control joints, all exposed perimeter edges, and edges of expansion joints, prior to filling with sealant, to a smooth bullnose form, using an edger having a radius of $\frac{1}{4}$ ", as approved.
 - 2. Form control joints in uniform straight lines, spaced no greater than 5 feet apart. Coordinate exact locations and alignment with Owners Representative.
- 3.4 CURING AND PROTECTION
- A. The Contractor shall use all necessary precautions to keep cracking of all concrete work to an absolute minimum. Beginning immediately after placement, protect concrete from premature drying, excessively hot and cold temperatures, and mechanical injury.
 - 1. Maintain curing procedures used for seven (7) days at minimum temperature of 50° F; if mean daily temperature drops below 40° F during this period, extend curing period an equal number of days or provide temporary heat or additional protection to maintain specified minimum temperature of air in contact with concrete.
 - B. Temperature, wind, and humidity;
 - 1. When concrete slab placements are subjected to high temperatures, wind and/or low humidity the Owners Representative may require the use of the specified evaporation retarder to minimize plastic cracking. The compound may be required to be applied one or more times during the finishing operation. The initial application is usually made after the strike- off operation.
 - 2. Cold weather:
 - a. When the mean daily temperature outdoors is less than 40°F, maintain the temperature of the concrete between 50°F and 70°F for the required curing period.
 - b. When necessary, provide a proper and adequate heating system capable of maintaining the required heat without injury due to concentration of heat.
 - c. Do not use combustion heaters during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.
 - d. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 - e. Only the specified non-corrosive non-chloride accelerator shall be used. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are not permitted.
 - 3. Hot weather:
 - a. When necessary, provide wind breaks, fog spraying, shading, sprinkling, ponding, or wet covering with a light colored material, applying as quickly as concrete hardening and finishing operations will allow.
 - 4. Rate of temperature change:
 - a. Keep the temperature of the air immediately adjacent to the concrete during and immediately following the curing period as uniform as possible

and not exceeding a change of 5° F in any one hour period, or 50° F in any 24 hour period.

C. Curing Walls & Formed Surfaces:

1. Where forms are exposed to the sun, minimize moisture loss by keeping the forms wet until they can be removed safely.
2. In hot weather, immediately after forms have been removed, cure by continuous sprinkling or covering with absorptive mat or fabric kept continuously wet or use vapor mist bath.
3. In freezing weather, protect in accordance with ACI 301.

- D. Curing Exterior Slabs:
 - 1. Spray slabs with liquid membrane-forming compound specified above for exterior slabs, applied at not less than the manufacturer's specified and recommended rate.
- E. Curing and Sealing Interior Slabs:
 - 1. For Slabs to be Left Exposed and Sealed:
 - a. Spray new slab surfaces with liquid membrane-forming curing and sealing compound specified above, applied at not less than the manufacturer's specified and recommended rate and in accordance with manufacturer's written instructions.
 - b. Apply a minimum of two coats at right angles, strictly in accordance with the sealer manufacturer's written application instructions and recommendations, for a uniform, low gloss sheen finish.
 - c. In addition, all floor slabs shall be covered with blankets for a minimum of 72 hours after pouring.
 - d. After curing compound has fully dried per manufacturer's recommendations, Contractor shall cover such slab surfaces with protective sheeting as necessary to avoid damage due to subsequent construction work and prior to final finishing of such floor surfaces as specified below.
- F. Protection from mechanical injury:
 - 1. During the curing period, protect all concrete during period from damaging mechanical disturbances, more especially load stresses, heavy shock, and excessive vibration.
 - 2. Protect finished concrete surfaces from damage from construction equipment, materials and methods, from application of curing procedures, and from rain and running water.
 - 3. Do not load self-supporting structures in such a way as to overstress the concrete.

END OF SECTION 033450

SECTION 061000 - ROUGH
CARPENTRY PART 1 - GENERAL

1.1 SUMMARY

- A. Provide wood, nails, bolts, screws, framing anchors and other rough hardware, and other items needed, and perform rough carpentry for the construction shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Codes and standards:
 - 1. In addition to complying with the pertinent codes and regulations of governmental agencies having jurisdiction, unless otherwise specifically directed or permitted by the Owners Representative, comply with:
 - a. "Product Use Manual" of the Wood Products Association for selection and use of products included in that manual;
 - b. "Plywood Specification and Grade Guide" of the American Plywood Association;
 - c. "National Design Specifications for Wood Construction (NDS)" of the American Forest and Paper Association.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Protection:
 - 1. Deliver the materials to the job site and store, in a safe area, out of the way of traffic, and shored up off the ground surface.
 - 2. Identify framing lumber as to grades, and store each grade separately from other grades.
 - 3. Protect metals with adequate waterproof outer wrapping.
 - 4. Use extreme care in off loading of lumber to prevent damage, splitting, and breaking of materials.

PART 2 - PRODUCTS

2.1 GRADE STAMPS

- A. Identify framing lumber by the grade stamp
such other grade stamp as is approved in advance by the Owners Representative.
- B. Identify plywood as to species, grade, and glue type by the stamp of the American Plywood Association.
- C. Identify other materials of this Section by the Appropriate stamp of the agency approved in advance by the Owners Representative.

2.2 MATERIALS

- A. Provide materials in the quantities needed for the Work shown on the Drawings, and meeting or exceeding the following standards of quality, unless otherwise noted on the drawings:
 - 1. Horizontal framing members: Douglas Fir-Larch, NDS Table 4A or 4D, No. 1 or better for members larger than 2x10; NDS Table 4A or 4D, No. 2 or better for 2x10 and smaller members.
 - 2. Vertical framing members: Douglas Fir-Larch, NDS Table 4A or 4D, No. 1, or better. Posts shall be Douglas Fir No. 1, or better.
 - 3. Plates shall be Douglas Fir-Larch, NDS 4A or 4D, No. 1, or better. Nailers, bridging, and blocking: Douglas Fir-Larch NDS Table 4A, No. 2, or better.

4. Moisture content of framing lumber shall not exceed 19% by weight at time of installation.
5. Plywood: (PS-1 plywood bearing the APA trademark of the American Plywood Association.)
 - a. Sheathing: Plywood or Oriented-Strand-Board sheathing with exterior glue, grades and sizes as shown on the Drawings.
 - a. Backboard: 3/4" thick A/D, group 1, interior.
6. Wood Preservative: Ammoniacal copper arsenite, or 5% solution of pentachlorophenol. All wood in contact with earth, with concrete slabs on grade, and with concrete or masonry foundations shall be pressure preservatively treated Douglas Fir, or foundation grade redwood. All hangars and connections shall be nailed for maximum capacity. All framing anchors, connections, nails, etc. that are attached to pressure treated wood shall have the proper protective finish as required for that pressure treated material.
7. Rough hardware:
 - a. Steel items:
 - i. Comply with ASTM A7 or ASTM A36.
 - ii. Use galvanized at exterior locations.
 - b. Machine bolts: Comply with ASTM A307.
 - c. Lag bolts: Comply with Fed Spec FF-B-561.
 - d. Nails:
 - i. Use common of the gage and size noted in NDS Table No. L4.
 - ii. Comply with Fed Spec FF-N-1.
 - iii. Use galvanized at exterior locations.
 - e. Joist hangers: Simpson, Silver, or equal as approved by the Owners Representative, having ICBO approval.
 - f. All framing anchors, connections, nails, etc. that are attached to pressure treated wood shall have the proper protective finish as required for that pressure treated material.
8. Microlams: Microlam members shall be minimum 1.9 E D.F. "MICRO=LAM" as manufactured by Trus Joist, or approved equal, having ICBO approval..

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

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

3.2 DELIVERIES

- A. Stockpile materials sufficiently in advance of need to assure their availability in a timely manner for this Work.
- B. Make as many trips to the job site as are needed to deliver materials of this Section in a timely manner to ensure orderly progress of the Work.

3.3 COMPLIANCE

- A. Do not permit materials not complying with the provisions of this Section to be brought onto or to be stored at the job site.
- B. Promptly remove non-complying materials from the job site and replace with materials meeting the requirements of this Section.

3.4 WORKMANSHIP

- A. Produce joints which are tight, true, and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.
- B. Selection of lumber pieces:
 1. Carefully select the members.
 2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.
 3. Lumber may be rejected by the Owners Representative, whether or not it has been installed, for excessive knots, splits, warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

- C. Do not shim any framing component.
- 3.5 GENERAL FRAMING
 - A. General:
 - 1. In addition to framing operations normal to the fabrication and erection indicated on the Drawings, install wood blocking and backing required for the work of other trades.
 - 2. Set horizontal and sloped members with crown up.
 - 3. Do not notch, cut, or bore members for pipes, ducts, or conduits, or for other reasons except as shown on the Drawings or as specifically approved in advance by the Owners Representative. Cutting or notching of wood studs per IBC 2308.9.10 and 2308.9.11 will not be allowed.
 - B. Bearings:
 - 1. Make bearings full unless otherwise indicated on the Drawings.
 - 2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.
 - 3. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.
- 3.6 BLOCKING AND BRIDGING
 - A. Install blocking as required to support items of finish and to cut off concealed draft openings, both vertical and horizontal, between ceiling and floor areas. Also provide blocking at all unsupported wall sheathing edges, at edges of all roof and wall openings, and as required for a complete and proper installation.
 - B. Bridging:
 - 1. Install wood cross bridging (not less than 2" X 3" nominal), metal cross bridging of equal strength, or solid blocking between joists where shown.
 - 2. Cross bridging may be omitted for roof and ceiling joists where the omission is permitted by code, except where otherwise indicated on the Drawings.
 - 3. Install solid blocking between joists at points of support, and where shown on the Drawings. Blocking may be omitted where joists are supported on metal hangers, unless shown otherwise on the Drawings.
- 3.7 ALIGNMENT
 - A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.
- 3.8 INSTALLATION OF PLYWOOD SHEATHING
 - A. Placement:
 - 1. Place horizontal plywood with face grain perpendicular to supports and continuously over at least two supports, except where otherwise shown on the Drawings. Place vertical plywood with face grain parallel to supports with supports or blocking at all plywood edges.
 - 2. Center joints accurately over supports
- 3.9 FASTENING
 - A. Nailing:
 - 1. Use only common wire nails or spikes of the dimensions shown on the Drawings and the IBC Nailing Schedule, except where otherwise specifically noted. Use deformed shank nails on all plywood wall sheathing receiving plaster.
 - 2. For conditions not covered in the Nailing Schedule provide penetration into the piece receiving the point of not less than 1/2 the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.
 - 3. Nail without splitting wood.
 - 4. Remove split members and replace with members complying with the specified requirements.
 - B. Bolting:
 - 1. Drill holes 1/16" larger in diameter than the bolts being used.
 - 2. Drill straight and true from one side only.
 - 3. Do not bear bolt heads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.

C. Screws:

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

END OF SECTION 061000

SECTION 061900 - WOOD
TRUSSES PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide wood trusses where shown on the Drawings, as specified herein, and as needed for a complete and proper installation
- B. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 01 of these Specifications.
 - 2. Section 061000: Rough Carpentry.

1.2 SUBMITTALS

- A. Product data: Submit:
 - 1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements including loading, minimum member sizes, shapes, etc.;
 - 2. Shop Drawings showing species, sizes, and stress grades of lumber proposed to be used; pitch, span, camber, configuration, and spacing of trusses; connector type, thickness, size, location, and design value; and bearing details;
 - 3. Manufacturer's recommended installation procedures which, when approved by the Owners Representative, will become the basis for accepting or rejecting actual installation procedures used on the Work.
 - 4. Certification, signed by an officer of the fabricating firm, indicating that the trusses comply with the design and project requirements.
 - 5. The shop drawings are interpretations of and are supplemental to the design drawings and specifications. Their intent is to demonstrate to the Owners Representative that this Contractor has understood the design concept, and to provide the detailed information necessary for the fabrication, assembly and installation of the products or materials specified. Neither the shop drawings nor comments placed on them by the Owners Representative shall be construed as being change orders.

1.3 QUALITY ASSURANCE

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

PART 2 - PRODUCTS

2.1 WOOD TRUSSES

- A. Design:
 - 1. Provide the services of a civil or structural engineer registered to practice in the State of Michigan. This engineer shall design the wood trusses to sustain the indicated loads for the spans, profiles, and arrangements shown on the Drawings, and shall stamp and seal the truss shop drawings. Total load deflection shall be limited to no more than L/240. Live load deflection shall be limited to no more than L/360.
 - a. Comply with pertinent provisions of:
 - i. "Timber Construction Standards" of the American Institute of Timber Construction;
 - ii. "Quality Control Manual" of the Truss Plate Institute;
 - iii. The building code having jurisdiction.
 - 2. Fabrication:
 - a. Prefabricate in strict accordance with the Shop Drawings and other data approved by the Owners Representative.

2.2 OTHER MATERIALS

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

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

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

3.2 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Owners Representative, anchoring all components firmly into position for long life under hard use.
 - 1. Hoist the trusses into position with proper bracing secured at designated lifting points.
 - 2. Exercise care to keep out-of-plane bending of trusses to a minimum.
 - 3. Install temporary horizontal and cross bracing to hold trusses plumb and in safe condition until permanent bracing is installed.
 - 4. Install permanent bracing and related components prior to application of loads to trusses.
 - 5. Tighten loose connectors.
 - 6. Restrict construction loads to prevent overstressing of truss members.
 - 7. Do not cut or remove truss members.

END OF SECTION 061900

SECTION 074113 METAL ROOF, WALL, AND SOFFIT PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal Roof Panels:
 - a. Standing seam roof system, 1-3/4 inch (44 mm) seam height. (SSL-175) to match existing
- B. Metal Wall Panels:
 - 1. Fastener wall system to match existing
- 2. Metal Wall and Soffit Panels:
 - 3. Flush wall and soffit system. (FP-100)
 - 4. Reveal flush wall and soffit system. (RP-100)
- C. Metal Soffit Panels:
 - 1. Reveal panel soffit system. (W-LOC)

1.2 RELATED SECTIONS

- A. Section 05 10 00 - Structural Metal Framing.
- B. Section 05 40 00 - Cold-Formed Metal Framing.
- C. Section 07 60 00 - Flashing and Sheet Metal.
- D. Section 07 90 00 - Joint Protection.
- E. Section 08 90 00 - Louvers and Vents

1.3 REFERENCES

- A. Standing Seam Roof System, 1-3/4 Inch (44 mm) Seam Height: To match existing metal panels
 - 1. Compliance:
 - a. Uplift Resistance: UL 580 Class 90.
 - b. Structural Performance: ASTM E330. E72 and E1592.
 - c. Air Infiltration: ASTM E283.
 - d. Water Penetration: ASTM E331 and E1646.
 - e. Fire Rating: UL Class A Rated Assemblies, UL 263 and UL 790.
 - f. Hail Impact Rating: Class 4, UL 2218.
 - g. Florida Building Code: Approved.
 - h. Impact Resistance: PA 201.
 - i. Wind Driven Rain: TAS 100.
 - j. ** NOTE TO SPECIFIER ** Delete article if not required.

1.4 METAL WALL PANELS

- A. Fastener Wall System: to match existing metal panels
 - 1. Compliance:
 - a. Air Infiltration: ASTM E283.
 - b. Water Penetration: ASTM E331.

1.5 METAL WALL AND SOFFIT PANELS

- A. Flush Wall and Soffit System: To match existing building

PART 2 EXECUTION

6. MISCELLANEOUS MATERIALS

- 6.2.1 Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 6.2.1.1 Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
 - 6.2.1.2 Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- 6.2.2 Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- 6.2.3 Gutters: Formed from same material as roof panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof panels.
- 6.2.4 Downspouts: Formed from same material as roof panels. Fabricate in 10-foot-long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.
- 6.2.5 Panel Fasteners: Self-tapping screws designed to withstand design loads.
- 6.2.6 Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 6.2.6.1 Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
 - 6.2.6.2 Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.

6.3 FABRICATION

- 6.3.1 General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- 6.3.2 Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- 6.3.3 Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 6.3.3.1 Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 6.3.3.2 Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat- lock seams. Tin edges to be seamed, form seams, and solder.
 - 6.3.3.3 Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 6.3.3.4 Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 6.3.3.5 Fabricate cleats and attachment devices from same material as accessory

being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

- 6.3.3.5.1 Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

6.4 FINISHES

- 6.4.1 Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- 6.4.2 Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 7 - EXECUTION

7.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

7.2 PREPARATION

- 7.2.1 Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

7.3 METAL PANEL INSTALLATION

- 7.3.1 General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 7.3.1.1 Shim or otherwise plumb substrates receiving metal panels.
 - 7.3.1.2 Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
 - 7.3.1.3 Install screw fasteners in predrilled holes.
 - 7.3.1.4 Locate and space fastenings in uniform vertical and horizontal alignment.
 - 7.3.1.5 Install flashing and trim as metal panel work proceeds.
 - 7.3.1.6 Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 - 7.3.1.7 Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
 - 7.3.1.8 Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- 7.3.2 Fasteners:
 - 7.3.2.1 Steel Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.

- 7.3.3 Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- 7.3.4 Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- 7.3.5 Standing-Seam Metal Roof Panel Installation: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
 - 7.3.5.1 Install clips to supports with self-tapping fasteners.
 - 7.3.5.2 Install pressure plates at locations indicated in manufacturer's written installation instructions.
- .Watertight Installation:
 - 7.3.5.2.1 Apply a continuous ribbon of sealant or tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.
 - 7.3.5.2.2 Provide sealant or tape between panels and protruding equipment, vents, and accessories.
 - 7.3.5.2.3 At panel splices, nest panels with minimum 6-inch end lap, sealed with sealant and fastened together by interlocking clamping plates.
- 7.3.6 Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
 - 7.3.6.1 Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof panel manufacturers; or, if not indicated, types recommended by metal roof panel manufacturer.
- 7.3.7 Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 7.3.7.1 Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof and weather-resistant performance.
 - 7.3.7.2 Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- 7.3.8 Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- 7.3.9 Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
 - 7.3.9.1 Provide elbows at base of downspouts to direct water away from building.
- 7.4 ERECTION TOLERANCES
 - 7.4.1 Installation Tolerances: Shim and align metal panel units within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
- 7.5 CLEANING AND PROTECTION
 - 7.5.1 Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On

- completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- 7.5.2 Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- END OF SECTION 074113

SECTION 07 46 19

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
1. Silicone joint sealants.
 2. Mildew-resistant joint sealants.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
1. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.5 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F .
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Sealants and sealant primers used inside the weatherproofing system shall comply with the following:
1. Sealants and sealant primers for nonporous substrates shall have a VOC content of 250 g/L or less.
 2. Sealants and sealant primers for nonporous substrates shall have a VOC content of 775 g/L or less.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Dow Corning Corporation; 790
 - b. GE Silicones; SCS 9000
 - c. Tremco; Spectrem I
 - d. Pecora 890

2.3 MILDEW-RESISTANT JOINT SEALANTS

- A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.
- B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, nonsag, plus 25 percent and minus 25 percent movement capability, nontraffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

- 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pecora Corporation; 898
 - b. Tremco: Tremsil 200
 - c. Dow 999A
 - d. GE Silpruf SCS-1700

2.4 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. CMU.
 - b. Wood.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.

- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for

- products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
 - C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
 - D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
 - E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.
- 3.4 CLEANING
- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.5 PROTECTION
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes hollow-metal work.
- B. Related Requirements:
 - 1. Section 087100 "Door Hardware" for door hardware for hollow-metal doors.

1.3 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings according to NAAMM-HMMA 803 or SDI A250.8.

1.4 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include the following:
 - 1. Elevations of each door type.
 - 2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.
 - 5. Details of each different wall opening condition.
 - 6. Details of anchorages, joints, field splices, and connections.
 - 7. Details of accessories.
 - 8. Details of moldings, removable stops, and glazing.
 - 9. Details of conduit and preparations for power, signal, and control systems.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal work palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal work vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain hollow-metal work from single source from single manufacturer.

2.2 EXTERIOR HOLLOW-METAL DOORS AND FRAMES

- A. Construct exterior doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Maximum-Duty Doors and Frames: SDI A250.8, Level 4. At locations indicated in the Door and Frame Schedule.
 1. Physical Performance: Level A according to SDI A250.4.
 2. Doors:
 - a. Type: As indicated in the Door and Frame Schedule.
 - b. Thickness: 1-3/4 inches
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.067 inch , with minimum A40 coating.
 - d. Edge Construction: Model 2, Seamless.
 - e. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
 3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.067 inch , with minimum A40 coating.
 - b. Construction: Face welded.
 4. Exposed Finish: Prime.

2.3 MATERIALS

- A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.

2.4 FABRICATION

- A. Fabricate hollow-metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for metal thickness. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.
- B. Hollow-Metal Doors:
 1. Vertical Edges for Single-Acting Doors: Bevel edges 1/8 inch in 2 inches .
 2. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets.
 3. Bottom Edge Closures: Close bottom edges of doors with end closures or channels of same material as face sheets.
 4. Exterior Doors: Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
- C. Hollow-Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
- D. Fabricate concealed stiffeners and edge channels from either cold- or hot-rolled steel sheet.
- E. Hardware Preparation: Factory prepare hollow-metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to SDI A250.6, the Door Hardware Schedule, and templates.
 1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
 2. Comply with applicable requirements in SDI A250.6 and BHMA A156.115 for

preparation of hollow-metal work for hardware.

2.5 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

3.2 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

3.3 INSTALLATION

- A. General: Install hollow-metal work plumb, rigid, properly aligned, and securely fastened in place. Comply with Drawings and manufacturer's written instructions.
 - B. Hollow-Metal Frames: Install hollow-metal frames of size and profile indicated. Comply with SDI A250.11 or NAAMM-HMMA 840 as required by standards specified.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
 - a. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
 - b. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - c. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Installation Tolerances: Adjust hollow-metal door frames for squareness, alignment, twist, and plumb to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch , measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch , measured at jambs on a horizontal line parallel to plane of wall.
 - c. Plumbness: Plus or minus 1/16 inch , measured at jambs at floor.
 - C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Non-Fire-Rated Steel Doors:
 - a. Between Door and Frame Jambs and Head: 1/8 inch plus or minus 1/32 inch .
 - b. Between Edges of Pairs of Doors: 1/8 inch to 1/4 inch plus or minus 1/32 inch .
 - c. At Bottom of Door: 5/8 inch plus or minus 1/32 inch .
 - d. Between Door Face and Stop: 1/16 inch to 1/8 inch plus or minus 1/32 inch .
- 3.4 ADJUSTING AND CLEANING
- A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow-metal work that is warped, bowed, or otherwise unacceptable.
 - B. Remove grout and other bonding material from hollow-metal work immediately after installation.

- C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

END OF SECTION 081113
SECTION 08 36 00
COMMERCIAL OVERHEAD SECTIONAL DOORS

PART 3 GENERAL

3.1 SECTION INCLUDES

- A. Architectural Series:
 - 1. Steel insulated full view sectional overhead doors.
- B. Non-insulated:
 - 1. Raised-panel steel doors, non-insulated.
- C. Electric Door Operators.

3.2 RELATED SECTIONS

- A. 06100 - Rough Carpentry.
- B. 07900 - Joint Seals.
- C. 08710 - Door Hardware and locks.
- D. 09900 - Paints and Coatings.

3.3 REFERENCES

- A. American Owners Representative s Manufacturers Association (AMAA):
 - 1. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- B. American National Standards Institute (ANSI):
 - 1. ANSI/DASMA 102 - American National Standards Specifications for Sectional Doors.
- C. ASTM International (ASTM):
 - 1. ASTM B 209/209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - 2. ASTM B 221/221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
 - 3. ASTM B 653/653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- D. Door and Access Systems Manufacturers Association (DASMA):
 - 1. DASMA TDS-163 - R-Value and U-Factor as Applied to A Residential or Commercial Garage Door

3.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
 - 4. Operation and maintenance data.
 - 5. Nameplate data and ratings for motors.
- C. Shop Drawings: Include opening dimensions and required tolerances, connection details, anchorage

spacing, hardware locations, and installation details.

- D. Selection Samples: Upon request furnish color samples or 2 x 2 ft (600 x 600 mm) section sample.

3.5 WIND PERFORMANCE REQUIREMENTS

- A. Design doors to withstand positive and negative wind loads as calculated in accordance with applicable building code and detailed in structural documents.

3.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Minimum ten years of documented experience.
- B. Installer Qualifications: Minimum five years of documented experience and authorized by the door manufacturer.

3.7 WARRANTY

- A. Manufacturers Limited Warranty aluminum sectional overhead doors.
 - 1. Standard finish warranty against cracking, checking, or peeling for 5 years Color Blast Finish option warranty for 5 years; Parts and Hardware for 1 year. Extended 8-Year Hardware Warranty option.
- B. Manufacturers Limited Warranty steel sectional overhead doors:
 - 1. Standard finish warranty against cracking, checking, or peeling for 10 years. Custom color option Color Blast Finish limited warranty period for 5 years; Delamination warranty for 10 years; Parts and Hardware for 1 year. Extended 8-Year Hardware Warranty option.
 - 2. Standard finish warranty against cracking, checking, or peeling for 10 years. Custom color option Color Blast Finish limited warranty period for 5 years. Delamination warranty for 5 years; Parts and Hardware for 1 year. Extended 8-Year Hardware Warranty option.
 - 3. Standard finish warranty against cracking, checking, or peeling for 10 years. Color Blast Finish option warranty for 5 years; Parts and Hardware for 1 year. Extended 8-Year Hardware Warranty option.

PART 4 PRODUCTS

4.1 MANUFACTURERS

- A. Acceptable Manufacturer: Clopay Corporation, which is located at: 8585 Duke Blvd.; Mason, OH 45040; Toll Free Tel: 800-233-8366; Tel: 513-770-4800; Fax: 888-434-3193; Email: [request info \(arch@clopay.com\)](mailto:requestinfo@arch@clopay.com); Web: <https://www.clopaydoor.com> | <https://www.clopaycommercial.com>
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

4.2 RAISED PANEL STEEL DOORS, NON-INSULATED

- A. Clopay Model 664. Heavy duty raised panel steel doors, non-insulated.
 - 1. Maximum Door Size (WxH): 20 ft x 18 ft (6.10 x 5.49 m).
 - 2. Exterior Skin Thickness: 24 gauge 0.022 inch (0.56 mm).
 - 3. Interior Finish of Exterior Skin: White.
 - 4. End Stiles: Pre-painted steel.
 - a. For Door Widths up to 16 ft 2 inches (4.9 m): 18 ga 0.049 inch (1.25 mm) thick.
 - 5. Windows: None.
 - 6. Finish: Raised panel wood grain exterior design, pre-finished exterior with 1-mil, three coat baked-on polyester topcoat over primer on a phosphate coating.
 - a. Exterior Color: White.
 - 7. Lock Type: No Lock
 - 8. Door Drop Safety Device: Provide brackets designed to stop the fall of the door should lift cables

- fail.
- 9. Weatherstripping: Complete perimeter seals.
- 10. Hinge and Roller Assemblies: Hinges and Brackets: 14 ga 0.070 inch (1.78 mm) galvanized steel. Ten, full-floating ball bearing steel rollers; case hardened steel bearing races. Mounted to fit track taper.
- 11. Track Size: 2 inches (51 mm) track for 2 inch (51 mm) diameter rollers.
 - a. Horizontal Tracks 0.075 inch (1.91 mm) galvanized steel.
- 12. Track configuration to maximize headroom available per plans.
- 13. Torsion Spring Counterbalance: Low stress, helically wound, oil-tempered spring on galvanized steel tube or solid steel shaft. Die cast aluminum. Pre-formed galvanized steel aircraft cable. 7 to 1 safety factor.
 - a. High Cycle Spring: 100,000 cycles
- B. Door Construction:
 - 1. Panels: Steel embossed woodgrain raised panel steel door.
 - 2. Steel Skin: Formed from roll formed commercial or drawing quality steel sheet, hot-dip galvanized per ASTM A924/A924M and ASTM A653/A 53M, pre-painted with primer and baked-on polyester topcoat.
 - 3. Section Joint: Sections to form a weather-tight tongue and groove joint.
 - 4. Steel Reinforcement: Galvanized and primed. Located under each hinge location. Pre-punched for hinge attachment.

4.3 ELECTRIC DOOR OPERATORS

- A. Electric Door Operator: Comply with NFPA 70. Provided by door manufacturer with operational life specified complete with electric motor and factory pre-wired motor controls, starter, gear-reduction unit, clutch, remote-control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
 - 1. Design Operator to allow motor to be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.
 - 2. Solenoid-operated brake.
- B. Disconnect Device: Hand-operated for emergency manual operation while disconnecting motor, without affecting timing of limit switch. Mount disconnect and operator accessible from floor level. Interlock device automatically prevents motor from operating when emergency operator is engaged.
- C. Control Equipment: Comply with NEMA ICS1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, AC or DC.
- D. Electric Motors: High-starting torque, reversible, continuous-duty, Class A insulated, electric motor, complying with NEMA MG 1, with overload protection, sized to start, accelerate, and operate door in either direction, from any position, at not less than 2/3 fps (0.2 m/s) and not more than 1 fps (.03m/s), without exceeding nameplate ratings or considering service factor.
 - 1. Reference Electrical Schedules for phase and voltage per location.
 - 2. Provide horsepower in accordance with manufacturer recommendations per door size and type.
- E. Remote Control Station: Continuous contact, 3-button control station with push - button controls labeled "Open", "Close" and "Stop".
 - 1. Interior units, fully guarded, surface mounted, heavy-duty type, with general-purpose NEMA ICS 6 enclosure in one of the following types:
 - a. Enclosure Type: Type 1.
- F. Obstruction Detection Device: For full width of the door opening. Each motorized door to have external automatic safety sensor. Activation of sensor immediately stops and reverses downward door travel.
 - 1. Sensor Edge: Automatic safety sensing edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cord.
 - 2. Sensing Edge Operation:
 - a. Photo-electric control: Provide each motorized door with a photo-electric device that will stop

and reverse the downward door travel if the light beam is broken or blocked. Device shall be:
1) NEMA Type 4.

- G. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.
- H. Radio Controls: 3 button radio transmitter providing remote open, close, stop functionality. External antenna and coaxial wiring to receiver enhancing radio control reception.

PART 5 EXECUTION

5.1 EXAMINATION

- A. Examine wall and overhead areas, including opening framing and blocking, with installer present, for compliance with requirements for installation tolerances, clearances, and other conditions affecting performance of Work in this Section.
- B. If substrate preparation is the responsibility of another installer, notify Owners Representative of unsatisfactory preparation before proceeding.

5.2 PREPARATION

- A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

5.3 INSTALLATION

- A. Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.

5.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes:

- 1. Mechanical door hardware for the following:
 - a. Swinging doors.

- B. Related Sections:

- 1. Section 081113 "Hollow Metal Doors and Frames"

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction and installation details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Other Action Submittals:

- 1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
 - b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page.
 - c. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - d. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Fastenings and other pertinent information.
 - 5) Explanation of abbreviations, symbols, and codes contained in schedule.
 - 6) Mounting locations for door hardware.
 - 7) List of related door devices specified in other Sections for each door and frame.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Warranty: Special warranty specified in this Section.

1.5 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals. Include final hardware schedule.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Owners Representative, and Owner about door hardware and keying.
 - 1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
- B. Source Limitations: Obtain each type of door hardware from a single manufacturer.
- C. Means of Egress Doors: Latches do not require more than 15 lbf to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf .
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.
 - 4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.
- E. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Inspect and discuss preparatory work performed by other trades.
 - 3. Inspect and discuss electrical roughing-in for electrified door hardware.
 - 4. Review sequence of operation for each type of electrified door hardware.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
- C. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.8 COORDINATION

- A. Installation Templates: Distribute for doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion, unless otherwise indicated.
 - a. Manual Closers: 10 years from date of Substantial Completion.

1.10 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, provide six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Provide parts and supplies that are the same as those used in the manufacture and installation of

original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by descriptive titles corresponding to requirements specified in Part 2.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Hager
 - b. McKinney Products Company
 - c. Stanley Commercial Hardware; Division of The Stanley Works
- B. Antifriction-Bearing Hinges:
 - 1. Mounting: Full mortise (butts).
 - 2. Bearing Material: Ball bearing.
 - 3. Grade: Grade 1 (heavy weight).
 - 4. Base and Pin Metal:
 - a. Exterior Hinges: Stainless steel with stainless-steel pin.
 - b. Interior Hinges: Stainless steel with stainless-steel pin.
 - 5. Pins: Maximum security.
 - 6. Tips: Flat button.
 - 7. Corners: Square.

2.3 MECHANICAL LOCKS AND LATCHES

- A. Bored Deadbolt Locks: BHMA A156.5: Grade 1 with strike that suits frame.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Schlage Deadbolt B663P
 - 2. Backset: 2-3/4 inches .
 - 3. Material: Stainless steel.
 - 4. Deadlocks: Deadbolt operated by key outside and turn inside.

2.4 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
- B. High-Security Lock Cylinders: BHMA A156.30; Grade 1; Type M, mechanical; permanent cores that are removable; face finished to match lockset.
 - 1. Number of Pins: Seven.
 - 2. Type: Bored-lock type.
- C. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 10 construction master keys.
- D. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.5 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
 - 1. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
 - 2. Keyed Alike: Key all cylinders to same change key.
- B. Keys: Brass.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: Information to be furnished by Owner.

2.6 OPERATING TRIM

- A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited

to, the following:

- a. Ives
- b. Trimco
- c. Don-Jo Mfg., Inc.
- d. Hager Companies
- e. Rockwood Manufacturing Company

- B. Flat Push Plates: 0.050 inch thick, 4 inches wide by 16 inches high with square corners and beveled edges; secured with exposed screws.
- C. Straight Pull-Plate Door Pulls: 0.050-inch-thick plate, 4 inches wide by 16 inches high with square corners and beveled edges; pull with minimum clearance of 1-1/2 inches from face of door.
 1. Type: 1-inch constant-diameter pull.
 2. Mounting: Surface applied with concealed fasteners.
 3. Overall Pull Length: 10 inch.

2.7 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. LCN
 - b. Norton
- B. Cast-Aluminum Surface Closers: Grade 1; Traditional Type with mechanism enclosed in cast-aluminum alloy shell.
 1. Mounting: Parallel arm.
 2. Type: Heavy Duty Arm.
 3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
 4. Mounting Method: Vandal Resistant Torque Fasteners

2.8 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Pemko
 - b. Rixson Specialty Door Controls
 - c. National Guard Products, Inc.
- B. Adhesive-Backed Perimeter Gasketing: Vinyl bulb gasket material applied to frame rabbet with self-adhesive.
- C. Combination Door Shoe/Kick Plate: Thermoplastic elastomer gasket material held in place by aluminum housing; mounted to bottom edge of door with screws.
 1. Extended Housing: Both sides of door up 3 inches.
 2. Mounting: Surface mounted on bottom edge of door.

2.9 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Pemko
 - b. Rixson Specialty Door Controls
 - c. National Guard Products, Inc.
- B. Saddle Thresholds:

1. Type: Fluted top, barrier free.
2. Base Metal: Aluminum.

2.10 FABRICATION

- A. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.
- B. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.
 1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
 2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
 3. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.11 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

3.3 INSTALLATION

- A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 3. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- B. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- C. Intermediate Offset Pivots: Where offset pivots are indicated, provide intermediate offset pivots in quantities indicated in door hardware schedule but not fewer than one intermediate offset pivot per door and one additional intermediate offset pivot for every 30 inches of door height greater than 90 inches .
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 1. Replace construction cores with permanent cores as directed by Owner.

- E. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- F. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- G. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- 3.4 ADJUSTING
 - A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - B. Occupancy Adjustment: Approximately six months after date of Substantial Completion, Installer's Architectural Hardware Consultant shall examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors, door hardware, and electrified door hardware.
- 3.5 CLEANING AND PROTECTION
 - A. Clean adjacent surfaces soiled by door hardware installation.
 - B. Clean operating items as necessary to restore proper function and finish.
 - C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.
- 3.6 DEMONSTRATION
 - A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain door hardware and door hardware finishes.
- 3.7 DOOR HARDWARE SCHEDULE

Exterior Steel-Single (Door 1)

Quan	Item	Description	Manufacturer
1	DEADBOLT LOCKS	B663P X US32D	SCHLAGE
	Mount deadbolt locks at 52 inches from finish floor on door		
1	PULL PLATE	8303-0-US32D-4"X16"-G	IVES
1	PUSH PLATE	8300-0-US32D-4"X16"-G	IVES
3	HINGES	BB1168 4.5x4.5 US32D NRP	HAGER
1	WEATHERSTRIP	PK55BL	PEMKO
1	DOOR BOTTOM	221PK	PEMKO
1	THRESHOLD	2748A	PEMKO
1	CLOSER	4040-62PA-3077EDA-72MC	LCN

END OF SECTION 087100

SECTION 312001 - STRUCTURAL EARTHWORK
PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide all site stripping, excavation, fill, backfill, and grading, as specified therein, and as noted on the Drawings.
 - B. Related Work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
- 1.2 QUALITY ASSURANCE
- A. Geotechnical Engineer: The Owner will retain and pay the expenses of a Geotechnical Engineer for performing certain functions specified in the Contract Documents. The Geotechnical Engineer shall communicate only with the Owner and the Owners Representative, and with the Contractor as directed by the Owners Representative. The Owners Representative shall relay any appropriate instructions to the Contractor within the provisions of the Contract Documents.
 - B. Testing Agency: Local testing laboratory with a minimum of three years experience in testing soil materials. All reports prepared by the Testing Agency shall be signed by a Professional Engineer registered to practice as a Civil Engineer in the state of Michigan.
 - C. Testing laboratory shall have the same required qualifications as the Testing Agency but shall be retained by the Owner. Testing laboratory will make field tests as directed of the "in place" materials to assure conformance with Contract Documents.
 - D. Source Quality Control: Prior to delivery to site, the Testing Agency shall test all imported soil material for conformance with Contract Documents. Also on site fill materials shall be approved by the Geotechnical Engineer prior to placing.
 - E. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.
 - F. Use equipment adequate in size, capacity, and numbers to accomplish the Work of this Section in a timely manner.
 - G. Reference Standards:
 - 1. ASTM - American Society for Testing and Materials.
 - a. D 422 - Particle Size Analysis of Soils.
 - b. D 424 - Plastic Limit and Plasticity Index of Soils.
 - c. D 1556 - Standard Test Method for Density of Soil in Place by the Sand Cone Method.
- 1.3 SUBMITTALS
- A. Test Reports: Submit test reports on proposed imported materials, and compaction test reports on all compacted materials.
- 1.4 JOB CONDITIONS
- A. Existing Conditions:
 - 1. Soils Data: No soils investigation report was prepared for this project.
 - a. The absence of records of investigations of soil or subsurface conditions and/or logs of test borings:
 - 1) Shall not be construed as a waiver of the Contractor's duty to examine the site of the Work as contemplated and the Contractor is cautioned to make such independent investigations and examinations as he deems necessary to satisfy himself as to the subsurface conditions to be encountered in the performance of the Work.
 - 2) Will not relieve the Contractor from the risk of unanticipated soil or subsurface conditions or from properly fulfilling the terms of the Contract or the Contract Sum.
 - 2. Information shown on the Drawings regarding existing site conditions is believed to be correct, but it is not guaranteed. Contractors shall visit the site for necessary information and data regarding present ground levels, ground water level, conditions of property, locations and size of obstructions, and access, etc.
 - 3. Where existing utilities are encountered which are not shown on the Drawings or evident from a site inspection, contact the Owners Representative immediately for instructions. If such lines are inadvertently broken through no fault of the Contractor's operation, they shall be repaired by the Contractor, and an adjustment will be made in payment by the Owner. Breakage of lines shown on the Drawings or evident by a site inspection will be repaired by the Contractor at no increase in Contract Sum.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. For structural fill and backfill use imported or approved on-site materials which are non- expansive conforming to the following: Granular soil, free of organic material and debris and free of clods, lumps and rocks larger than 4-inch diameter. Material shall be reasonably well graded with not more than 40-percent passing a No. 200 sieve, not more than 70-percent passing a No. 40 sieve, and not less than 70 percent passing a $\frac{3}{4}$ " sieve, liquid limit – 35 maximum, plastic index – 15 maximum. All material shall be approved by the Geotechnical Engineer prior to delivery and use.
- B. Site non-structural fill may be any on site materials free of debris and rocks larger than 4- inch diameter or imported materials as specified in "A" above.
- C. Drain Rock: Provide clean, crushed 1" minus rock or open graded drain rock, or use a $\frac{3}{4}$ " rock topped with chips to prevent concrete from penetrating the drain rock. Drain Rock materials shall be approved by the Geotechnical Engineer prior to delivery and use.
- D. Moisture Barrier: A moisture barrier shall be provided under all interior slabs on grade unless noted otherwise. It shall be placed directly below the aggregate base. The moisture barrier shall be Mirafi "MCF-1212", Stego Wrap 15 mil, or approved equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

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

3.2 PREPARATION

- A. Lay out the building and all site work in conformance with Contract Documents. Establish necessary benchmarks. Protect them and existing benchmarks shown on the Site Plan, until completion of the Work.

3.3 PERFORMANCE

- A. Perform no earthwork during inclement weather, or when excessive moisture is present in the fill material.
- B. Should rainfall or snow-melt occur following footing excavation and prior to pouring footing, dry the excavation thoroughly and recompact the soils below the footing prior to placing footing.
- C. Use no frozen fill. Place no fill on frozen ground.
- D. When rains or snow-melt interrupt fill operations, inspect the surface before more fill is placed to assure that detrimental conditions do not exist.
- E. Clearing and Grubbing: The areas to receive compacted fill for support of foundations, paving, and slabs shall be stripped of all debris, fill soils, crop growth, vegetation, surface trash, roots larger than 2 inches in diameter, and incidental topsoils as determined by the Geotechnical Engineer.
- F. Stripping: The upper 12", as determined by the Geotechnical Engineer, shall be removed from structural areas prior to placement of footings, aggregate base, or structural fill. Also any existing debris and former construction shall be completely removed from the site.
- G. Excavation:
 - 1. Excavate as necessary to obtain required subgrade elevations.
 - 2. Excavate as necessary to allow room for placement and removal of foundation formwork.
 - 3. Form all footings with wood, metal, or earth forms as specified in SECTION 031000, "CONCRETE FORMWORK."
- H. Compaction of Exposed Soils: The soils exposed by excavations, which are to receive compacted fill or footings, shall be scarified, watered or dried as necessary to obtain the proper moisture content as directed by the Geotechnical Engineer, and compacted to a depth of 12", to at least 95-percent of maximum dry density. If, in the opinion of the Geotechnical Engineer, the existing soils at the bottom of the footing excavations are at 95-percent of maximum dry density or above, then these soils may not require scarification and recompaction, as determined by the Geotechnical Engineer.
- I. Fill and Backfill:
 - 1. Fill as required to obtain required subgrades.

2. Backfill foundations and stemwalls.
 3. Place fill and backfill materials in 8-inch thick maximum loose layers. In general, place in horizontal layers extending uniformly over the area to be filled. Compact each layer as specified prior to placing the subsequent layer.
 4. Water or dry fill materials as necessary to obtain the proper moisture content as directed by the Geotechnical Engineer. These soils shall then be compacted to the following minimum densities, based on ASTM D1557 Method A or C.
 - a. Structural fill - at least 95-percent dry density for fills under footings or slabs on grade.
 - b. Non-structural fill on site - 90-percent minimum dry density.
 - J. Moisture Barrier:
 1. Where moisture barrier is required by plans, place moisture barrier beneath aggregate base. Place, lap and tape seams in accordance with manufacturer recommendations.
 - K. Aggregate Base:
 1. Provide the aggregate base placed on top of the moisture barrier membrane and compact to at least 95 percent under pavement and other exterior and interior slabs. Also compact the upper 12" of subgrade below this base to 95 percent relative compaction.
 2. Establish finish grade of base at the required elevation with a level uniform surface varying not more than 1/2-inch when measured in any direction with a 10-foot straight edge.
 3. Compact drainrock by two passes at right angles with an approved vibratory compactor.
 - L. Site Grading:
 1. After completion of all excavation, fill and backfill, rake surface to a 4-inch depth to remove all rocks and debris in excess of 2-inches in diameter. Remove this material from the site.
 2. Grade all areas including excavated and filled sections and transition areas to obtain a finished surface, reasonably smooth, compacted, and free from irregular surface changes. Leave all ditches, swales, and gutters finished to drain readily.
- 3.4 FIELD QUALITY CONTROL
- A. Soil Compaction Test: The Owner will pay the testing Laboratory for the first compaction test at any test location. All retests required because fill materials were not compacted to the required density shall be paid for by the Contractor.
 - B. The Geotechnical Engineer shall review all sitework and footing excavations before any concrete is cast, and submit a letter of compliance to the Owners Representative. The Geotechnical Engineer shall review all backfill materials prior to placement and observe backfill operations. A letter of compliance shall be submitted to the Owners Representative stating that fills have been constructed per the requirements of these Specifications.
 - C. Provide at least the following tests to the approval of the Geotechnical Engineer:
 1. At paved areas, at least one (1) field density test for every 4000 sq. ft. of paved area, but not less than three (3) tests.
 2. In each compacted fill layer, one (1) field density test for every 4000 sq. ft. of overlaying area, but not less than three (3) tests.
 - D. If, in the Geotechnical Engineer's opinion, based on reports of the testing laboratory, subgrade or fills have been placed below specified density, provide additional compacting and testing.
- 3.5 MAINTENANCE
- A. Protection of newly graded areas:
 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
 2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.
 - B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

END OF SECTION 312001