



PROJECT MANUAL & SPECIFICATIONS

HANOVER ST. GARAGE RESTORATION

PORTSMOUTH, NH

January 2022

PREPARED FOR:

CITY OF PORTSMOUTH, NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS
680 Peverly Hill Rd.
Portsmouth, NH 03801

BID # 21-22

ISSUED FOR BIDDING & CONSTRUCTION



WALKER
CONSULTANTS

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SECTION 00 11 16 - INVITATION TO BID AND INSTRUCTIONS TO BIDDER

**City of
Portsmouth**
Department of Public Works



MEMO TO BIDDERS

BID#21-22 Hanover Street Garage Restoration

Built in 1985 and now well beyond its expected duration of use, the High / Hanover parking garage structure is in need of immediate repair, as detailed in the engineering analysis completed in FY21.

The Project consists of providing all materials, labor, equipment, supervision, and services required to perform a multi-phased multi-year construction project indicated for years 2022, 2023, and 2024. Restoration work will involve the following: structural concrete repairs to topping and precast planks, concrete topping removal and replacement, joint sealant removal and replacement, expansion seal removal and replacement, application of traffic bearing waterproofing membrane system, structural steel framing repairs, full paint system application to steel framing, masonry wall repairs, masonry and precast façade cleaning, traffic striping, floor drains and line replacement, stairway repairs, fire protection standpipe replacement, and other miscellaneous work that is identified to be completed in the Hanover Street Parking Garage. Work is intended to be performed over a 3-Year construction period in accordance with the Contract Documents.

Work phase sequence

1. Construction phasing sequence is priority based using 70/30 capacity ratio (*approx. 260 vehicle spaces max. and drive lanes for construction use*). Work starts on level 3, then 2 and then 4 and 5.
2. Traffic signage and traffic controls to direct internal vehicle flow around work and safe zone enclosures are required by the contractor.
3. Temporary signage for pedestrian wayfinding inside the garage during construction are required by the Contractor.
4. The garage restoration program has three main disciplines of work: Concrete and waterproofing, Steel frame painting, and masonry façade repairs. Construction phasing represents the work being undertaken on the floors and framing with the timing between phases critical to keep the project moving effectively. Steel framing painting and masonry work would likely follow the demo and concrete repairs.
5. Masonry facade work on each elevation will impose more restrictions to the use of sidewalk bounding the garage with a multitude of significant internal restrictions for parking already in place.

PART 1 -

11.1 PROJECT IDENTIFICATION AND DEFINITIONS

- A. Owner will receive sealed Bids for: **Hanover St. Garage Restoration Portsmouth, NH
BID # 21-22**
- B. Owner is **City of Portsmouth, New Hampshire**
- C. Engineer/Architect is: WALKER Consultants.
20 Park Plaza Suite 1202 Boston, MA

Project consists of providing all materials, labor, equipment, supervision, incidentals, and services required to perform a multi-phased multi-year construction project indicated for years **2022, 2023, and 2024**. Restoration work will involve the following: structural concrete repairs to topping and precast planks, concrete topping removal and replacement, joint sealant removal and replacement, expansion seal removal and replacement, application of traffic bearing waterproofing membrane system, structural steel framing repairs, full paint system application to steel framing, masonry wall repairs, masonry and precast façade cleaning, traffic striping, floor drains and line replacement, stairway repairs, fire protection standpipe replacement, and other miscellaneous work that is identified to be completed in the Hanover Street Parking Garage. Work is intended to be performed over a 3-Year construction period in accordance with the Contract Documents.

- D. Bids will be received for single contract for all three construction years in accordance with the construction documents. The award of a single contract is expected to be awarded within 60 days of bid opening.
- E. Owner will receive Bid submissions as follows:

Bid submission shall be marked on the outside of the mailing envelope with the Bid Number and project name on the sealed bid envelope addressed to Purchasing Department, City Hall, 1 Junkins Ave, Portsmouth, NH 03801

Bids will be accepted on Monday February 28, 2022, by 2:00 p.m. at which time they will be opened and read aloud for this project.

11.2 DOCUMENTS

- A. Contract between Owner and Contractor: Contract Documents listed in Agreement. Also see Section "Agreement Form."
- B. Contract Documents may be examined at following locations during normal business hours:

**Finance/Purchasing Department
City of Portsmouth, New Hampshire
1 Junkins Avenue
Portsmouth, NH 03801**

- C. Complete sets of Bidding Documents shall be used in preparing Bids. Neither Owner nor Engineer/Architect assume any responsibility for errors or misinterpretations resulting from use of incomplete sets of Bidding Documents.
- D. Owner and Engineer/Architect in making copies of Bidding Documents available on above terms do so only for purpose of obtaining Bids on Work and do not confer license or grant for any other use.
- E. Bid documents may be obtained from the City's web site: <http://www.cityofportsmouth.com/finance/purchasing.htm>, by contacting the Finance/Purchasing Department on the third floor at the above address, or by calling the Purchasing Coordinator at 603-610-7227. Addenda to this bid document, if any, including written answers to questions, will be posted on the City of Portsmouth website at <http://www.cityofportsmouth.com/finance/purchasing.htm> under the project heading. Addenda and updates will NOT be sent directly to vendors. Questions may be addressed to the Purchasing Coordinator.

11.3 QUALIFICATIONS OF BIDDERS

- A. To demonstrate qualifications to perform Work, each bidder must be prepare and submit section 00 45 13 Bidder Qualification Statement – Structural Restoration Work with written evidence of types of experience and such as financial data, previous experience, and evidence of authority to conduct business in jurisdiction where Project is located. **Qualifications Statement to be submitted by February 14, 2022**
- B. Owner may make such investigation as it deems necessary to determine ability of Bidder to perform Work, and Bidder shall furnish to Owner all such information and data for this purpose as Owner may request. Owner reserves right to reject any Bid if evidence submitted by, or investigation of, such Bidder fails to satisfy Owner that such Bidder is properly qualified to carry out obligations of Contract and to complete Work contemplated therein. **Conditional Bids and voluntary alternates will not be accepted.**
- C. Bidding firms will not be considered qualified if:
 - Firm, or principals thereof, have defaulted on any contract, bid or bond within preceding 36 months, or.
 - Firm has had no previous experience in performance of Work being bid, or.
 - Firm, as name entitled, has not been in operation in this type of Work for period of 24 months prior to this bid date, or.
 - Firm has not been awarded any prior contracts of similar amount and kind, or.
 - Firm, or principals thereof, have failed in faithful performance during warranty or guarantee period on previous Work.
 - Firm is found to have misstated or omitted any material fact in this prequalification statement.

- D. The Owner will reserve the right to request Bidders provide the following information:

Comprehensive financial statement showing current balance of unencumbered net worth equal to at least 10% of value of anticipated bid price.

Comprehensive list of personnel and equipment available for performance of Work to be bid.

Complete list of all contract work performed, or under construction if contract(s) awarded within previous 5 yr. period prior to bidding.

See Structural Restoration Contractor's Qualification Statement section for additional requested information and submittal of these forms with the bid procurement document.

11.4 EXAMINATION OF CONTRACT DOCUMENTS AND SITE

- A. Bidders shall carefully examine contract documents and site to obtain first-hand knowledge of existing conditions. No subsequent extras will be allowed due to any claim of lack of knowledge for conditions which can be determined by examining the site and reviewing the contract documents.
- B. Extent of repairs is approximately represented on Drawings. Actual locations and extent of repair may deviate from that represented on Drawings based on field conditions. Contractor will be responsible to verify conditions with Engineer prior to the start of work.
- C. Submission of Bid shall constitute warranty that:

Bidder and all Subcontractors it intends to use have carefully and thoroughly reviewed Contract Documents and have found them complete and free from ambiguities and sufficient for purposes intended; further that,

1. Bidder and all workers, employees, and Subcontractors it intends to use are skilled and experienced in type of construction represented by Contract Documents bid upon; further that,
2. Neither Bidder nor any of its employees, agents, suppliers, or Subcontractors have relied on any verbal representations from Owner, Engineer/Architect, or any of their employees, agents, or consultant, in assembling Bid figure; and further that,

Bid figure is based solely on Contract Documents, including properly issued written addenda, and not upon any other written representation.

Reference is made to Supplementary Conditions for identification of those reports of investigations and tests of subsurface and latent physical conditions at site or otherwise affecting cost, progress or performance of Work which have been relied upon by Engineer/Architect in preparing Drawings and Specifications. These reports are not guaranteed as to accuracy or completeness, nor are they part of Contract Documents. Before submitting its Bid, each bidder may, at its own expense, make such additional investigations and tests as it may deem necessary to determine its Bid for performance of Work in accordance with time, price and other terms and conditions of Contract Documents.

- D. Bidder shall identify, prior to bid, all errors and/or discrepancies in Contract Documents that would be apparent to reasonably diligent Bidder. In no case shall Bidder, if selected as Contractor, be permitted any extra amount of time or money to complete project, or expenses incurred as result of such errors or discrepancies.

11.5 RESOLUTION OF DISCREPANCIES AND AMBIGUITIES

- A. All questions about meaning or intent of Contract Documents shall be e-mailed to the Finance/Purchasing via the City of Portsmouth Website.

The addendum and answers to questions will be posted to the City of Portsmouth website. Bidding. Questions received less than 5 days prior to date for opening of Bids will not be answered. Only answers contained in formal written Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

- B. Any Addendum issued during prebid period shall be included in Bid, shall become part of Contract Documents, and shall be acknowledged on Bid Form.

11.6 SUBSTITUTED MATERIAL AND EQUIPMENT

- A. Contract, if awarded, will be on basis of material and equipment described in Drawings or specified in Specifications without consideration of possible substitute or "or-equal" items. Whenever it is indicated in Drawings or specified in the Specifications that substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer/Architect, application for such acceptance will not be considered by Engineer/Architect until after "effective date of Agreement."
- B. In advance of notice of Award, apparent successful Bidder, and any other Bidder so requested, will within seven days after day of Bid Opening submit to Owner list of substitutions proposed for products or materials specified for Project. After Award of Contract, procedure for submittal of any such application by Contractor and consideration by Engineer/Architect is set forth in Division 01 Sections, "Product Requirements" and "Product Substitution Procedures."

11.7 BASIS FOR BIDS

- A. Total project bid costs will be based upon a stipulated sum contract with unit prices shown on section 00 43 10 Procurement Form Supplements - Restoration. Bid form supplements must be completely fill out for each year and include all requested attachment documents as part of the submission.
- B. Contract years 2023 and 2024 costs shown on the procurement form submission will be considered for inflationary cost adjustment only at the beginning of those years. Contractor will be responsible to provide a request with sufficient backup to the City for affirmation and approval. Insufficient documentation to substantiate the request will be subject to rejection.

11.8 PREPARATION OF BIDS

- A. Bid Form is bound herewith. Bid Forms must be completed in ink or by typewriter.
- B. Bids must be made in form given in this Project Manual. No oral, telephonic, or telegraphic Bids will be considered. Bids shall be signed by Bidder giving full name and business address. State whether Bidder is individual, partnership or corporation.
- C. Each Bidder shall fill in all blanks on Bid Forms and quote on all alternates required. State all quotations in words and figures. In case of discrepancy between amount stated in words and amount stated in figures, amount stated in words shall govern. Entire Bid shall be without interlineation, alteration, or erasure.
- D. Bids by corporations shall be executed in corporate name by president, vice-president or other corporate officer (accompanied by evidence of authority to sign) and corporate seal shall be affixed and attested by secretary or assistant secretary. Corporate address and state of incorporation shall be shown below signature.
- E. Bids by partnerships shall be executed in partnership name and signed by partner. Partner's title must appear under partner's signature and official address of partnership must be shown below signature.
- F. Bids not signed by individuals making them shall have attached thereto power of attorney evidencing authority to sign Bid in name of person for whom it is signed.
- G. All names must be typed or printed legibly below signature.

11.9 BID SECURITY

- A. Each Bid shall be accompanied by certified check or Bid Bond in amount of 5% of base Bid, made payable to Owner. Bid Bond must be issued by surety licensed to conduct business in state where Project is located. Bid Security shall insure execution of Agreement and furnishing of Performance and Payment Bonds by successful bidder.
- B. In event successful Bidder fails or refuses to execute Agreement and furnish required Bonds within 15 days after receiving Notice of Award, Bid Security of that Bidder may be retained by Owner as liquidated damages, but not as penalty.
- C. Bid Security will be returned to all Bidders except 3 lowest Bidders within 7 days after Bid opening. Bid Security of 3 lowest Bidders will be returned within 7 days after Owner and accepted Bidder have executed Agreement and Performance and Payment Bonds have been approved by Owner. If required Agreement has not been executed within 60 days after Bid opening, Bid Security of any Bidder will be returned upon its request, provided it has not been notified of acceptance of its Bid prior to date of such request.
- D. Therefore, Owner reserves right to hold Bids of 3 lowest Bidders for period of 60 days, during which time above designated Bidders may not withdraw their Bids and Bid securities.

11.10 PERFORMANCE BOND, LABOR AND MATERIAL PAYMENT BOND AND INSURANCE

- A. Bidder to whom award is made will be required to furnish Performance and Labor and Material Payment Bonds in accordance with General Conditions. Bidder shall deliver said Bonds to Owner within 15 days after Notice of Award.
- B. Bidder shall include premiums for Bonds in its Bid. See Section "Bonds and Certificates" for bond form information. Bonds shall be dated same date as Agreement.
- C. Bidder to whom award is made shall be required to furnish Owner with insurance coverages as set forth in General and Supplementary Conditions. Bidder shall include all premiums for insurance in its Bid.

11.11 SUBCONTRACTOR LISTING

- A. If Supplementary Conditions require identity of certain Subcontractors and other persons and organizations to be submitted to Owner in advance of Notice of Award, apparent successful Bidder, and any other Bidder so requested, shall within seven days after day of Bid opening submit to Owner list of all Subcontractors and other persons and organizations (including those who are to furnish principal items of material and equipment) proposed for those portions of Work as to which such identification is so required. Such list shall be accompanied by experience statement with pertinent information as to similar projects and other evidence of qualification for each such Subcontractor, person and organization if requested by Owner.
- B. If Owner or Engineer/Architect after due investigation has reasonable objection to any proposed Subcontractor, other person, or organization, either may request apparent Successful Bidder to submit acceptable substitute before giving Notice of Award. If apparent successful Bidder declines to make any such substitution, contract shall not be awarded to such Bidder, but Bidder's declining to make any such substitution will not constitute grounds for sacrificing its Bid Security. Any Subcontractor, other person or organization so listed and to whom Owner or Engineer/Architect does not make written objection prior to the giving of Notice of Award will be deemed acceptable to Owner and Engineer/Architect.
- C. In contracts where Contract Price is on basis of Cost-of-the-Work Plus a Fee, apparent Successful Bidder, prior to Notice of Award, shall identify in writing to Owner those portions of Work that such Bidder proposes to subcontract and after Notice of Award may only subcontract other portions of Work with Owner's written consent.
- D. No Contractor shall be required to employ any Subcontractor, other person, or organization against whom it has reasonable objection.

11.12 IDENTIFICATION AND SUBMISSION OF BIDS

- A. Bids shall be submitted in duplicate at time and place indicated in Invitation to Bid and shall be placed in opaque sealed envelope, marked with Project title, and name and address of Bidder, and accompanied by Bid Security and other required documents.

11.13 MODIFICATION OR WITHDRAWAL OF BIDS

- A. Bids may be withdrawn by written, telegraphic, or e-mail request dispatched by Bidder in time for delivery, in normal course of business, prior to time fixed for opening of Bids, provided that written confirmation of any telegraphic or e-mail withdrawal, over signature of Bidder, is placed in mail and postmarked prior to time set for opening Bids.

11.14 GOVERNING LAWS AND REGULATIONS

- A. No Contractor shall discriminate against any employee or applicant for employment, to be employed in performance of contract, with respect to their hire, tenure, terms, conditions, or privileges of employment, because of their race, color, religion, gender identity, national origin, or age pursuant to requirements of all applicable federal and state statutes.
- B. Each Bidder shall make affidavit that its Bid is genuine and not sham or collusive or made in interests or on behalf of any person not therein named and that Bidder has not directly or indirectly induced or solicited any Bidder to put in sham Bid or any other person or corporation to refrain from Bidding, and that Bidder has not in any manner sought by collusion to secure itself an advantage over other Bidders.

11.15 CONTRACT TIME

- A. Number of days for completion of Work (Contract Time) is set forth in Section "Supplementary Conditions," and will be included in executed Agreement.
- B. Time is of essence in performance of Work under this Contract. Available time for Work under this Contract is indicated in Bid Form and will be include in executed Agreement. If these time requirements cannot be met, Bidder is requested to stipulate in Bid schedule for performance of Work. Consideration will be given to time in evaluating Bids.

11.16 LIQUIDATED DAMAGES

- A. Provisions for liquidated damages shall apply and identified in the contract agreement. Liquidated damages will apply for each day the project extends beyond the final completion date.

11.17 PRE-BID CONFERENCE

- A. A mandatory pre-bid conference will be held as listed below. All General Contract bidders shall be present. All other Bidders are encouraged to attend.
- B. Prebid Conference will be held at the Hanover St. Garage Portsmouth, NH on **February 14, 2022, at 10:00 a.m.** Conference Attendees shall be bidders and shall

assemble on level 2 near the garage office. A conference will be held on site followed by a walking review through the garage structure.

11.18 DISQUALIFICATION OF BIDDERS

- A. Prior to opening of Bids Owner reserves right to conduct investigations into qualifications and experience of any or all persons or organizations wishing to submit Bid for Project.
- B. Based upon findings of such investigations, Owner reserves right to deny any or all persons or organizations opportunity to submit Bid for Project.
- C. In evaluating Bids after Bids are opened and prior to Award of Contract, Owner shall consider qualifications of Bidders, whether or not Bids comply with prescribed requirements, and alternates and unit prices if requested in Bid Forms.
- D. Owner may consider qualifications and experience of Subcontractors and other persons and organizations (including those who are to furnish principal items of material or equipment) proposed for those portions of Work as to which identity of Subcontractors and other persons and organizations must be submitted as provided in Section "Supplementary Conditions." Operating costs, and maintenance considerations, performance data and guarantees of materials and equipment may also be considered by Owner.
- E. Owner may conduct such investigations as it deems necessary to assist in evaluation of any Bid and to establish responsibility, qualifications and financial ability of Bidders, proposed Subcontractors and other persons and organizations to do Work in accordance with Contract Documents to Owner's satisfaction within prescribed time.
- F. Owner reserves right to reject Bid of any Bidder who does not pass any such evaluation to Owner's satisfaction.
- G. Owner reserves right to disqualify Bids before or after opening, upon evidence of collusion with intent to defraud or other illegal practices upon part of Bidder.

11.19 BIDS TO REMAIN OPEN

- A. All Bids shall remain open for 60 days after Bid opening, but Owner will release all except 3 lowest Bids within 7 days after Bid opening.

11.20 AWARD OF CONTRACT

- A. Discrepancies between words and figures will be resolved in favor of words. Discrepancies between indicated sum of any column of figures and correct sum thereof will be resolved in favor of correct sum. The City of Portsmouth reserves the right to reject any or all bids, to waive technical or legal deficiencies or informalities, and to accept any bid that it may deem to be in the best interest of the City.

- B. In evaluating Bids, Owner shall consider qualifications of Bidders, whether or not Bids comply with prescribed requirements, and alternates and unit prices if requested in Bid Forms.
- C. It is Owner's intent to accept alternates (if any are accepted) in order in which they are listed in Bid Form but Owner may accept them in any order or combination.
- D. The award, if a contract is to be awarded, will for all three construction years based upon the "Best Value" offered to the City of Portsmouth, NH.
- E. If contract is to be awarded, Owner will give Successful Bidder Notice of Award within 60 days after day of Bid opening.

11.21 EXECUTION OF CONTRACT

- A. When Owner gives Notice of Award to Successful Bidder, it will be accompanied by at least 3 unsigned counterparts of Agreement and all other Contract Documents. Within 15 days thereafter Contractor shall sign and deliver at least 3 counterparts of Agreement to Owner with all other Contract Documents attached. Within 10 days thereafter Owner will deliver all fully signed counterparts to Contractor. Engineer/Architect will identify those portions of Contract Documents not fully signed by Owner and Contractor and such identification shall be binding on all parties.

11.23 CONTRACT PRICE

- A. Proposals are solicited on basis of unit prices and/or lump sum prices which are to be clearly set forth in Bid Form. Final Contract price on accepted Proposal will be determined by multiplying number, or fraction thereof, units of Work actually performed, or labor, material or appliances actually supplied, by price designated for such item in Proposal. Total Bid figure on Proposal Form is merely for purposes of estimating and comparing costs and under no circumstances on unit price contracts does it constitute or imply total Contract price. Refer to Section "Supplementary Conditions" for adjustments due to increases or decreases in actual quantities constructed.

END OF SECTION 00 11 16

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Name of Bidder _____

SECTION 00 41 00 - BID FORMS

41.1 INSTRUCTIONS

Submit Bids on this Bid Form in accordance with Instructions to Bidders.

41.2 BID FORM

PART 1 - TERMS OF BID

PROJECT IDENTIFICATION: **HANOVER ST GARAGE RESTORATION
PORTSMOUTH, NH**

CONTRACT IDENTIFICATION AND NUMBER:

THIS BID IS SUBMITTED TO: **CITY OF PORTSMOUTH, NEW HAMPSHIRE
PURCHASING DEPARTMENT**

- A. The undersigned BIDDER proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in form included in Contract Documents to complete all Work as specified or indicated in Contract Documents for Contract Price and within Contract Time indicated in this Bid and in accordance with Contract Documents.
- B. BIDDER accepts all of terms and conditions of Instructions to Bidders, including without limitation those dealing with disposition of Bid Security. BIDDER will sign Agreement and submit Contract Security and other documents required by Contract Documents within 15 days after date of OWNER's Notice of Award. This Bid will remain open for 60 days after day of Bid opening.
- C. In submitting this Bid, BIDDER represents, as more fully set forth in Agreement, that:

1. BIDDER has examined copies of all Contract Documents and of following addenda:

Date	Number
_____	_____
_____	_____

(receipt of all of which is hereby acknowledged) and also copies of Advertisement or Invitation to Bid or Instructions to Bidders.

2. BIDDER has examined site and locality where Work is to be performed, legal requirements (federal, state, and local laws, ordinances, rules, and regulations) and conditions affecting cost, progress or performance of Work and has made such independent investigations as BIDDER deems necessary.

Name of Bidder _____

3. This Bid is genuine and not made in interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; BIDDER has not directly induced or solicited any other Bidder to submit false or sham Bid; BIDDER has not solicited or induced any person, firm or corporation to refrain from bidding; and BIDDER has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER; and
4. BIDDER agrees that Work Item quantities are estimates and that OWNER may increase or decrease these quantities at unit prices stated, so long as increases, or decreases in Base Bid do not exceed 25% of Base Bid price. Increases or decreases beyond these limits shall be in accordance with Supplementary Conditions, Division 00.
5. BIDDER agrees that all alterations or additions to Work shall be performed in accordance with paragraph "Changes" and/or "Construction Change Directives" under Section "Supplementary Conditions."
6. OWNER reserves right to delete any Section of Work.

BIDDER agrees that Work for year 2022 shall be substantially completed within 196 calendar days after date when Contract Time commences to run, and fully completed within 203 calendar days after date when Contract Time commences to run.

BIDDER accepts provisions of Agreement as to liquidated damages in event of failure to complete Work on time.

- D. BIDDER will complete Work for following price(s) based on unit prices stated in Division 00 43 10:

PHASE 1 2022 LUMP SUM CONTRACT PRICE _____
(use words)
_____ DOLLARS \$ _____
(figures)

- E. BIDDER will complete Work for following price(s) based on unit prices stated in Division 00 43 10:

PHASE 2 2023 LUMP SUM CONTRACT PRICE _____
(use words)
_____ DOLLARS \$ _____
(figures)

- F. BIDDER will complete Work for following price(s) based on unit prices stated in Division 00 43 10:

Name of Bidder _____

PHASE 3 2024 LUMP SUM CONTRACT PRICE _____
(use words)

_____ DOLLARS \$ _____
(figures)

- G. BIDDER will complete Work for the prices shown in Section "List of Unit Prices."
- H. Communications concerning this Bid shall be addressed to: (BIDDER to provide bidder's name, address, telephone number and name of individual familiar with this Bid and able and authorized to answer questions regarding this Bid.)

- I. Terms used in this Bid which are defined in General Conditions of Construction Contract included as part of Contract Documents have meanings assigned to them in General Conditions.

SUBMITTED ON _____ , 20 ____

PART 2 - MATERIAL AND EQUIPMENT ALTERNATES

Base Bid proposal price shall include materials and equipment selected from designated items and manufacturers listed. The purpose of this requirement is to establish uniformity in bidding and to establish standards of quality for items named.

If BIDDER wishes to quote alternate items for consideration by Owner, it may do so under this Section. Complete description of item and proposed price differential must be provided. Unless approved at time of award, substitutions where items are specifically named will be considered only as negotiated change in Contract Sum.

<u>WORK ITEM</u>	<u>DESCRIPTION OF ALTERNATE ITEM(S)</u>	<u>ADD/DEDUCT AMOUNT</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Name of Bidder _____

PART 3 - ATTACHMENTS

Following documents are attached to and made condition of this Bid, unless noted otherwise:

- A. Required Bid Security in form:
- B. Substitution listing per the requirements of the Instructions to Bidders within 7 days after the day of the Bid opening.
- C. Equipment Suppliers' Listing.
- D. List of alternates/alternatives if any.
- E. Procurement Form List of Unit Prices.
- F. Non-Collusion Affidavit.
- G. A list of Subcontractors and other persons and organizations required to be identified, if so requested, per the requirements of the Instructions to Bidders within 7 days after the day of the Bid opening.
- H. Required Bidders Qualification Statement for Structural Restoration Work with supporting data per requirements of Instructions to Bidders within 14 days after day of Bid opening. Use form attached to Section "Instructions to Bidders." Copies of previously prepared statements on this form which are less than 12 months old will be acceptable.

Name of Bidder _____

PART 4 - SIGNATURES

If BIDDER is:

An Individual

By _____ (SEAL)
(Individual's Name)

doing business as _____

Business Address: _____

Phone Number: _____

A Partnership

By _____ (SEAL)
(Firm Name)

(General Partner)

(General Partner)

Business Address: _____

Phone Number: _____

Name of Bidder _____

A Corporation

By _____
(Corporation Name)

(State of Incorporation)

By _____
(Name of Person Authorized to Sign)

(Title)

(Corporate Seal)

Attest _____
(Secretary)

Business Address: _____

Phone Number: _____

A Joint Venture

By _____
(Name)

(Address)

By _____
(Name)

(Address)

Each joint venture member must sign. The manner of signing for each individual partnership and corporation that is party to joint venture should be in manner indicated above.

END OF SECTION 00 41 00

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SECTION 00 43 10 – PROCUREMENT FORM SUPPLEMENTS-RESTORATION

1.1 LIST OF ALTERNATES

- A. This Section identifies potential changes in the work under consideration for this contract. The Owner reserves the right to accept any or all of the listed Alternates, regardless of the order of their listing.

1.2 LIST OF UNIT PRICES

State Unit Prices on the following forms for Bid # 21-22:

CONSTRUCTION YEAR 2022

WORK ITEM	DESCRIPTION	UNITS	2022 QUANTITY	UNIT PRICE	EXTENSION
1.0	GENERAL REQUIREMENTS				
1.1	Project Mobilization	L.S.	1	-	
1.2	Concrete Formwork	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.3	Concrete Shores and Reshores	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.4	Concrete Reinforcement	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.5	Overhead Protection / Temporary Signage / Traffic Control	Incidental to Work Item 1.0			
3.0	CONCRETE REPAIR				
3.1	Floor Repair – Partial Depth / Shallow at Construction Joint	S.F.	800		
3.3	Floor Repair – Full Depth at Construction Joint	S.F.	600		
3.6	Floor Repair – Partial Depth Topping Strip Removal/Replacement	S.F.	13,000		
3.7	Concrete Repair – Concrete Wash	S.F.	175		
3.10	Floor Repair – Stair Nosing	E.A.	5		
3.11	Floor Repair – Stair Landing Partial Depth	S.F.	20		
3.12	Floor Repair – Remove / Replace ADA Curb Cut	E.A.	1		
4.0	CONCRETE CEILING REPAIR				
4.1	Ceiling Repair – Partial Depth / Shallow	S.F.	700		
4.2	Ceiling Repair – Partial Depth / Deep	S.F.	440		
6.0	CONCRETE COLUMN REPAIR				
6.6	Column Repair – Pier Base	EA.	8		
6.7	Column Repair – Pilaster	S.F.	250		
9.0	EXPANSION JOINT PREPARATION				
9.2	Expansion Joint Preparation – Blockout Repair	L.F.	25		
10.0	EXPANSION JOINT REPLACEMENT				
10.3	Expansion Joint – Elastomeric Concrete Edged	L.F.	230		
10.5	Expansion Joint – Adhered	L.F.	90		
11.0	CRACK AND JOINT REPAIR				
11.1	Remove and Replace Control Joint Sealant 1/2" Wide	L.F.	6,500		
11.2	Replace / Install Crack Sealant	L.F.	7,500		
11.4	Tool and Seal Patch Perimeters and Control Joints	Incidental to Work Item 3.0			
11.5	Remove and Replace Control Joint Sealant 1 1/2" Wide	L.F.	900		
11.7	Cove Sealant	Incidental to Work Item 16.0			
SUBTOTAL PAGE 00 43 10-2				\$	

WORK ITEM	DESCRIPTION	UNITS	2022 QUANTITY	UNIT PRICE	EXTENSION
15.0	PROTECTIVE SEALER				
15.1	Concrete Sealer – Floors	S.F.	18,500		
16.0	TRAFFIC TOPPING				
16.1	Traffic Topping – Vehicular	S.F.	54,000		
16.3	Traffic Topping – Pedestrian Areas (Stair towers 1, 2, 3)	S.F.	590		
25.0	MECHANICAL - DRAINAGE				
25.1	Mechanical – Allowance	ALL.	1	\$10,000	\$10,000
25.2	Mechanical – Supplemental / Replacement Floor Drains	EA.	11		
25.3	Mechanical – Pipe & Hanger 4" Line (New Supplementary drains)	L.F.	85		
25.4	Mechanical – Pipe & Hanger 6" Line	L.F.	95		
30.0	ELECTRICAL – LIGHTING				
30.1	Electrical Allowance	ALL.	1	\$5,000	\$5,000
37.0	DOORS, FRAMES AND HARDWARE				
37.1	Door and Frame Replacement	EA.	1		
40.0	CONNECTIONS / BEARINGS				
40.3	Re-weld Shear Connector	EA.	10		
41.0	STEEL STAIRS				
41.1	Replace Stair Riser / Pan / Fill	EA.	20		
41.2	Stair Landing Replacement	S.F.	130		
43.0	MISCELLANEOUS METALS				
43.1	Install Steel Closure Plate at Floor Perimeter	L.F.	450		
43.3	Install Chain Link Fence at Vehicle Barrier Strand	L.F.	460		
45.0	PAINTING				
45.1	Paint Traffic Markings	L.S.	1		
45.2	Paint Steel Framing in Stair Tower	E.A.	1		
45.3	Clean and Paint Structural Steel	L.S.	1		
45.6	Clean and Paint Galvanized Steel Framing – Expansion Area	L.S.	1		
SUBTOTAL PAGE 00 43 10-3				\$	

WORK ITEM	DESCRIPTION	UNITS	2022 QUANTITY	UNIT PRICE	EXTENSION
46.0	STRUCTURAL STEEL				
46.1	Structural Allowance – Inspection	ALL.	1	\$10,000	\$10,000
46.1A	Flange Repair	EA.	2		
46.1B	Bottom Flange Repair	EA.	1		
46.1C	Beam Repair	EA.	8		
46.1D	Stiffener and Gusset Plate Replacement	EA.	1		
46.1E	Angle Support	EA.	4		
46.1F	Beam Repair - Stiffener/Bracing	EA.	1		
46.1G	Column Repair	EA.	1		
46.1H	Column Flange Repair	EA.	1		
46.2	Supplemental Steel Beam Installation @ Damaged Filigree Plank	EA.	7		
SUBTOTAL PAGE 00 43 10-4				\$	

WORK ITEM	DESCRIPTION	UNITS	2022 QUANTITY	UNIT PRICE	EXTENSION
74.0	JOINT AND SEALANT REPAIR				
74.1	Isolation Joint Sealant Repair	L.F.	925		
74.7	Capstone Joint Repair	L.F.	245		
76.0	CRACK REPAIR AND TUCKPOINTING				
76.1	Rout and Seal Façade Cracks	L.F.	40		
76.3	Masonry Tuckpointing	S.F.	1,850		
76.4	Grout Joint Repair – Cornice	L.S.	3		
80.0	BRICK/CONCRETE MASONRY UNIT FAÇADE				
80.1	Remove and Replace Face Brick	S.F.	50		
80.2	Remove and Replace Rowlock Cap	L.F.	160		
80.3	Remove and Replace Concrete Masonry Unit	EA.	50		
80.4	Remove and Replace Capstone/Flashing	L.F.	105		
80.5	Remove and Replace Parapet Wall	L.F.	62		
80.6	Remove and Replace Parapet Wall w/Top Rail	L.F.	40		
80.7	Reset Precast Unit	EA.	7		
91.0	FAÇADE COATING/SEALING				
91.3	Penetrating Sealer (North, West Elev.)	L.S.	1		
95.0	DOORS & WINDOWS				
95.1	Replace Window Frame/Façade Perimeter Sealant	L.F.	350		
SUBTOTAL PAGE 00 43 10-5				\$	

Description of Abbreviations:

L.F. = Lineal Feet
EA. = Each
S.F. = Square Feet
L.S. = Lump Sum
ALL. = Allowance

SUBTOTAL PAGE 004310-2	\$
SUBTOTAL PAGE 004310-3	\$
SUBTOTAL PAGE 004310-4	\$
SUBTOTAL PAGE 004310-5	\$
2022 TOTAL	\$

CONSTRUCTION YEAR 2023

WORK ITEM	DESCRIPTION	UNITS	2023 QUANTITY	UNIT PRICE	EXTENSION
1.0	GENERAL REQUIREMENTS				
1.1	Project Mobilization	L.S.	1	-	
1.2	Concrete Formwork	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.3	Concrete Shores and Reshores	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.4	Concrete Reinforcement	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.5	Overhead Protection / Temporary Signage / Traffic Control	Incidental to Work Item 1.0			
3.0	CONCRETE REPAIR				
3.1	Floor Repair – Partial Depth / Shallow at Construction Joint	S.F.	5,000		
3.3	Floor Repair – Full Depth at Construction Joint	S.F.	2,000		
3.4	Floor Repair – Curbs / Walks	S.F.	450		
3.6	Floor Repair – Partial Depth Topping Strip Removal/Replacement	S.F.	9,300		
3.7	Concrete Repair – Concrete Wash	S.F.	175		
3.8	Floor Repair – Scaled Concrete Surface	S.F.	200		
3.10	Floor Repair – Stair Nosing	E.A.	5		
3.11	Floor Repair – Stair Landing Partial Depth	S.F.	20		
3.12	Floor Repair – Remove / Replace ADA Curb Cut	E.A.	3		
4.0	CONCRETE CEILING REPAIR				
4.1	Ceiling Repair – Partial Depth / Shallow	S.F.	900		
4.2	Ceiling Repair – Partial Depth / Deep	S.F.	700		
7.0	CONCRETE WALL REPAIR				
7.1	Wall Repair – Partial Depth / Shallow	S.F.	30		
9.0	EXPANSOIN JOINT PREPARATION				
9.2	Expansion Joint Preparation – Blockout Repair	L.F.	25		
10.0	EXPANSION JOINT REPLACEMENT				
10.3	Expansion Joint – Elastomeric Concrete Edged	L.F.	125		
10.5	Expansion Joint – Adhered	L.F.	60		
11.0	CRACK AND JOINT REPAIR				
11.1	Remove and Replace Control Joint Sealant 1/2" Wide	L.F.	3,800		
11.2	Replace / Install Crack Sealant	L.F.	7,500		
11.4	Tool and Seal Patch Perimeters and Control Joints	Incidental to Work Item 3.0			
11.5	Remove and Replace Control Joint Sealant 1 1/2" Wide	L.F.	150		
11.7	Cove Sealant	Incidental to Work Item 16.0			
SUBTOTAL PAGE 00 43 10-6				\$	

WORK ITEM	DESCRIPTION	UNITS	2023 QUANTITY	UNIT PRICE	EXTENSION
15.0	PROTECTIVE SEALER				
15.1	Concrete Sealer – Floors	S.F.	23,000		
16.0	TRAFFIC TOPPING				
16.1	Traffic Topping – Vehicular	S.F.	50,000		
16.3	Traffic Topping – Pedestrian Areas (Stair towers 1, 2, 3)	S.F.	460		
25.0	MECHANICAL - DRAINAGE				
25.1	Mechanical – Allowance	ALL.	1	\$10,000	\$10,000
25.2	Mechanical – Supplemental / Replacement Floor Drains	EA.	10		
25.3	Mechanical – Pipe & Hanger 4" Line (New Supplementary drains)	L.F.	90		
25.4	Mechanical – Pipe & Hanger 6" Line	L.F.	125		
25.5	Mechanical – Pipe & Hanger 8" Line	L.F.	62		
26.1	MECHANICAL – FIRE PROTECTION				
26.2	Mechanical – Fire Standpipe Replacement	L.F.	345		
30.0	ELECTRICAL – LIGHTING				
30.1	Electrical Allowance	ALL.	1	\$5,000	\$5,000
37.0	DOORS, FRAMES AND HARDWARE				
37.1	Door and Frame Replacement	EA.	1		
40.0	CONNECTIONS / BEARINGS				
40.3	Re-weld Shear Connector	EA.	10		
41.0	STEEL STAIRS				
41.1	Replace Stair Riser / Pan / Fill	EA.	10		
41.2	Stair Landing Replacement	S.F.	65		
43.0	MISCELLANEOUS METALS				
43.1	Install Steel Closure Plate at Floor Perimeter	L.F.	450		
43.3	Install Chain Link Fence at Vehicle Barrier Strand	L.F.	410		
45.0	PAINTING				
45.1	Paint Traffic Markings	L.S.	1		
45.2	Paint Steel Framing in Stair Tower	E.A.	1		
45.3	Clean and Paint Structural Steel	L.S.	1		
45.4	Paint Concrete Masonry Surfaces in Stairtower #1	L.S.	1		
45.5	Paint Standpipe	L.S.	1		
45.6	Clean and Paint Galvanized Steel Framing – Expansion Area	L.S.	1		
SUBTOTAL PAGE 00 43 10-7				\$	

Description of Abbreviations:

L.F. = Lineal Feet
EA. = Each
S.F. = Square Feet
L.S. = Lump Sum
ALL. = Allowance

SUBTOTAL PAGE 004310-6	\$
SUBTOTAL PAGE 004310-7	\$
2023 TOTAL	\$

CONSTRUCTION YEAR 2024

WORK ITEM	DESCRIPTION	UNITS	2024 QUANTITY	UNIT PRICE	EXTENSIO N
1.0	GENERAL REQUIREMENTS				
1.1	Project Mobilization	L.S.	1	-	
1.2	Concrete Formwork	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.3	Concrete Shores and Reshores	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.4	Concrete Reinforcement	Incidental to Work Item 3.0, 4.0, 5.0, 6.0 & 7.0			
1.5	Overhead Protection / Temporary Signage / Traffic Control	Incidental to Work Item 1.0			
3.0	CONCRETE REPAIR				
3.1	Floor Repair – Partial Depth / Shallow at Construction Joint	S.F.	400		
3.3	Floor Repair – Full Depth at Construction Joint	S.F.	100		
3.4	Floor Repair – Curbs / Walks	S.F.	25		
3.7	Concrete Repair – Concrete Wash	S.F.	200		
3.10	Floor Repair – Stair Nosing	E.A.	13		
3.11	Floor Repair – Stair Landing Partial Depth	S.F.	140		
4.0	CONCRETE CEILING REPAIR				
4.1	Ceiling Repair – Partial Depth / Shallow	S.F.	200		
4.2	Ceiling Repair – Partial Depth / Deep	S.F.	75		
9.0	EXPANSOIN JOINT PREPARATION				
9.2	Expansion Joint Preparation – Blockout Repair	L.F.	25		
10.0	EXPANSION JOINT REPLACEMENT				
10.3	Expansion Joint – Elastomeric Concrete Edged	L.F.	170		
10.5	Expansion Joint – Adhered	L.F.	220		
11.0	CRACK AND JOINT REPAIR				
11.1	Remove and Replace Control Joint Sealant 1/2" Wide	L.F.	10,800		
11.2	Replace / Install Crack Sealant	L.F.	7,500		
11.4	Tool and Seal Patch Perimeters and Control Joints	Incidental to Work Item 3.0			
11.5	Remove and Replace Control Joint Sealant 1 1/2" Wide	L.F.	5200		
11.7	Cove Sealant	Incidental to Work Item 16.0			
SUBTOTAL PAGE 00 43 10-9				\$	

WORK ITEM	DESCRIPTION	UNITS	2024 QUANTITY	UNIT PRICE	EXTENSIO N
15.0	PROTECTIVE SEALER				
15.1	Concrete Sealer – Floors	S.F.	42,000		
16.0	TRAFFIC TOPPING				
16.1	Traffic Topping – Vehicular	S.F.	49,000		
16.3	Traffic Topping – Pedestrian Areas (Stair towers 1, 2, 3)	S.F.	500		
16.4	Traffic Topping – Recoat Stairtower Landings Stair #4	S.F.	650		
25.0	MECHANICAL - DRAINAGE				
25.1	Mechanical – Allowance	ALL.	1	\$10,000	\$10,000
25.2	Mechanical – Supplemental / Replacement Floor Drains	EA.	9		
25.3	Mechanical – Pipe & Hanger 4" Line (New Supplementary drains)	L.F.	5		
25.4	Mechanical – Pipe & Hanger 6" Line	L.F.	100		
30.0	ELECTRICAL – LIGHTING				
30.1	Electrical Allowance	ALL.	1	\$5,000	\$5,000
37.0	DOORS, FRAMES AND HARDWARE				
37.1	Door and Frame Replacement	EA.	2		
40.0	CONNECTIONS / BEARINGS				
40.3	Re-weld Shear Connector	EA.	10		
41.0	STEEL STAIRS				
41.1	Replace Stair Riser / Pan / Fill	EA.	1		
41.2	Stair Landing Replacement	S.F.	60		
43.0	MISCELLANEOUS METALS				
43.1	Install Steel Plate at Floor Perimeter	L.F.	450		
43.3	Install Chain Link Fence at Vehicle Barrier Strand	L.F.	460		
45.0	PAINTING				
45.1	Paint Traffic Markings	L.S.	1		
45.3	Clean and Paint Structural Steel	L.S.	1		
45.6	Clean and Paint Galvanized Steel Framing – Spot Locations @Expansion Area	L.S.	1		
SUBTOTAL PAGE 00 43 10-10				\$	

Description of Abbreviations:

L.F. = Lineal Feet
EA. = Each
S.F. = Square Feet
L.S. = Lump Sum
ALL. = Allowance

SUBTOTAL PAGE 004310-9	\$
SUBTOTAL PAGE 004310-10	\$
2024 TOTAL	\$

CONSTRUCTION YEAR TOTALS

CONSTRUCTION YEAR 2022	\$
CONSTRUCTION YEAR 2023	\$
CONSTRUCTION YEAR 2024	\$
3-YEAR PROJECT TOTAL	\$

1.3 NON-COLLUSION AFFIDAVIT

Bidder, by its officers and its agents or representatives present at the time of filing this Bid, being duly sworn on their oaths say, that neither they nor any of them have in any way, directly or indirectly, entered into any arrangement or agreement with any other Bidder, or with any officer of **City of Portsmouth New Hampshire and City Of Portsmouth, NH Public Works** whereby such affiant or affiants or either of them has paid or is to pay such other Bidder or officer any sum of money, or has given or is to give to such other Bidder or officer anything of value whatever, or such affiant or affiants or either of them has not directly or indirectly, entered into any arrangement or agreement with any other free competition into the letting of the contract sought for by the attached Bids that no inducement of any form or character other than that which appears on the face of the Bid will be suggested, offered, paid or delivered to any person whomsoever to influence the acceptance of the Bid or awarding of the Contract, nor has this Bidder any agreement or understanding of any kind whatsoever, with any person whomsoever to pay, deliver to, or share with any other person in any way or manner, any of the proceeds of the Contractor sought by this Bid.

Submitted By:

Type or print firm name:

Authorized Signature:

Date:

1.4 LIST OF SUBCONTRACTORS

	COMPANY ADDRESS	CONTACT PERSON NAME PHONE NUMBER FAX NUMBER
Demolition	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Ready-Mix Concrete	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Concrete Reinforcement	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Masonry/Stone	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Protective Sealer	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Traffic Topping	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Expansion Joints	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Sealants and Caulking	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Structural Steel Painting	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>
Cove Sealant	<hr/> <hr/> <hr/>	<hr/> <hr/> <hr/>

	COMPANY ADDRESS	CONTACT PERSON NAME PHONE NUMBER FAX NUMBER
Doors		
Construction Shoring		
Plumbing		
Fire Protection		
Structural Steel Repair		

END OF SECTION 00 43 10

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**SECTION 00 45 13 – BIDDER'S QUALIFICATION STATEMENT - STRUCTURAL
RESTORATION WORK**

This statement is required in advance of consideration of application to bid or as a qualification statement in advance of a restoration contract.

SUBMITTED TO: WALKER Consultants 20 Park Plaza Suite 1202, Boston, MA

Attn: Mark Zelepsky Mzelepsky@walkerconsultants.com

SUBMITTED BY: _____

ADDRESS: _____

PHONE: (____) _____

CONTACT: _____

COMPANY STRUCTURE:

- ☐ Corporation
- ☐ Partnership
- ☐ Individual
- ☐ Joint Venture
- ☐ Other (Explain)

SPECIAL CERTIFICATIONS:

- ☐ MBE
- ☐ WBE
- ☐ DBE (Explain): _____
- _____
- _____

SUBMITTAL DATE: _____

AREA(S) OF EXPERTISE: (Check all that apply, see below)

- | | |
|---|---|
| <input type="checkbox"/> Structural Concrete Repair: Precast | <input type="checkbox"/> Structural Concrete Repair – Cast in Place |
| <input type="checkbox"/> Expansion Seal repair/replacement | <input type="checkbox"/> Façade Brick/Masonry Repairs |
| <input type="checkbox"/> Waterproofing/Traffic Toppings & Sealers | <input type="checkbox"/> Historic Buildings |
| <input type="checkbox"/> Waterproofing/Roofing | <input type="checkbox"/> Stone Masonry Repairs |
| <input type="checkbox"/> Waterproofing/ Caulking/Joint Sealants | |
| <input type="checkbox"/> Structural Steel Repairs | |
| <input type="checkbox"/> Construction Shoring Installation | |
| <input type="checkbox"/> Selective Concrete Demolition | |

The category of expertise shall not include work that was subcontracted out by the qualifier. Area of expertise shall be considered work successfully completed by the contractor filing this qualification form.

1. How many years has your organization been in business as a structural restoration contractor? _____ Starting Year: _____
2. How many years has your organization been in business as a general contractor?
_____ Starting Year: _____
3. How many years has your organization been in business under its present business name?
_____ Starting Year: _____
4. List states in which your organization is legally qualified to do business.
5. What percentage of the work do you normally perform with your own work forces?
6. List on **Table I** the last five parking facility/bridge deck structural restoration projects your firm has completed.
7. List on **Table II** the structural restoration projects your organization has in progress at this time.
8. Have you ever failed to complete any work awarded to you? If so, attach a separate sheet of explanation.
9. Has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a construction contract? If so, attach a separate sheet of explanation.
10. List on **Table III** the construction experience of the principals and superintendents of your company.
11. List on **Table IV** the construction education or special training of the principals and superintendents of your company if applicable.
12. What is your present bonding capacity? \$_____ per Project,

\$_____ Aggregate
13. Who is your bonding agent?

NAME: _____

ADDRESS: _____

PHONE: (____) _____

CONTACT: _____
14. Are you rated by any State Highway Departments? If so, please list which states on **Table V** and your company's rating.
15. List on **Table VI** the equipment you own that is available for restoration work.

16. Are there any liens against the above? _____ If so, total amount \$_____

17. Attach your company's most recent audited Balance Sheet, prepared in accordance with generally accepted accounting principles. (Contractor to file attachment with the form)

Date of Balance Sheet: _____

Name of firm Balance Sheet: _____

DATED AT _____ THIS _____ DAY OF _____, 20_____.

Name of Organization: _____

By: _____

TITLE: _____

STATE OF: _____

COUNTY OF: _____

_____ being duly sworn, deposes and says that he/she is _____ of the above organization and that the answers to the questions in the foregoing questionnaire and all statements therein contained are true and correct.

SUBSCRIBING AND SWORN TO BEFORE ME THIS _____ DAY OF _____ 20_____.

NOTARY PUBLIC: _____

MY COMMISSION EXPIRES: _____

TABLE I - LAST FIVE RESTORATION JOBS COMPLETED (PARKING STRUCTURES)			
Name and Address of Contractor			Date:
Owner Name, Address, and Contact Number	Type of Restoration Work	Contract Amount	Date Completed

TABLE II - LIST OF STRUCTURAL RESTORATION WORK IN PROGRESS			
Name and Address of Contractor			Date:
Owner Name, Address, and Contact Number	Type of Work	Contract Amount	Expected Completion Date

TABLE III - CONSTRUCTION EXPERIENCE OF PRINCIPALS AND SUPERINTENDENTS

Name and address of Contractor:					Date:
Name	Position	Years' Experience		Type of Work	Contract Amount
		Construction	Restoration		

TABLE IV - CONSTRUCTION EDUCATION OR SPECIAL TRAINING FOR PRINCIPALS AND SUPERINTENDENTS					
Name and address of Contractor:				Date:	
Name	Position	Education / Training		Year	Comments
		Construction	Restoration		

TABLE V - RATINGS BY STATE HIGHWAY DEPARTMENTS			
Name and address of Contractor:			Date:
State	Rating	Contact & Phone No.	Highway Jobs for Ea. State

TABLE VI - LIST OF EQUIPMENT			
Name and address of Contractor:			Date:
Description of Equipment	Quantity	Years of Service	Current Book Value

Hanover St. Garage Restoration Portsmouth, NH
Project Number 16-003129.00

Construction Documents
January 2022

END OF SECTION 00 45 13

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CONTRACT REQUIREMENTS

SECTION 00 52 00 - AGREEMENT FORM

PART 1 - GENERAL

- 1.1** Written Agreement will be executed on AIA Document A101 -2017, "STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR, WHERE THE BASIS OF PAYMENT IS A STIPULATED SUM."
- 1.2** Copies of Sample Agreement Form are available for examination at office of Engineer.
- 1.3** Contractor may purchase copies of Agreement Form from The American Institute of Architects, 1735 New York Avenue, N.W., Washington, DC 20006.
- 1.4** Liquidated damages will be included in Article 4 of Agreement.
- 1.5** Retainage for progress payments will be in accordance with Supplementary Conditions, SC-9.3.

END OF SECTION 00 52 00

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SECTION 00 61 13 – PERFORMANCE AND PAYMENT BOND

PART 1 - GENERAL

- 1.1** Performance Bond and payment Bonds shall be executed on AIA Document A312-2010, "PERFORMANCE BOND AND PAYMENT BOND," in accordance with General Conditions.
- 1.2** Sample copies of Bond forms are available for examination at office of Engineer.
- 1.3** Contractor may purchase copies of Agreement from The American Institute of Architects, 1735 New York Avenue, N.W., Washington, D.C. 20006.

END OF SECTION 00 61 13

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CONDITIONS OF THE CONTRACT

SECTION 00 72 00 - GENERAL CONDITIONS

PART 1 - GENERAL

- 1.1** AIA Document A201-2017, "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," Articles 1 through 15 inclusive, is hereby made part of Contract Documents.
- 1.2** Sample copies of General Conditions are available for examination at office of Engineer.
- 1.3** Contractor may purchase copies of Agreement Form from The American Institute of Architects, 1735 New York Avenue, N.W., Washington, DC 20006.
- 1.4** Supplementary Conditions Section shall amend or supplement General Conditions. All provisions of General Conditions not amended or supplemented by Supplementary Conditions remain in full force and effect.

END OF SECTION 00 72 00

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SECTION 00 90 00 – REVISIONS, CLARIFICATIONS, AND MODIFICATIONS

PART 1 - GENERAL

**1.1 ADDENDA AND MODIFICATIONS TO PROJECT ARE CONTAINED ON
FOLLOWING PAGES.**

PART 2 - NOT APPLICABLE

PART 3 - NOT APPLICABLE

END OF SECTION 00 90 00

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DRAFT AIA® Document A101® – 2017

Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

« »
« [City of Portsmouth](#) »
« [Department Of Public Works](#) »
« [Portsmouth, New Hampshire](#) »

and the Contractor:
(Name, legal status, address and other information)

« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

« [Hanover Street Garage Restoration](#) »
« [Portsmouth, New Hampshire](#) »
« [Bid# 21-22 Hanover Street Garage Restoration](#) »

The Architect:
(Name, legal status, address and other information)

« [Walker Consultants](#) »
« [20 Park Plaza Suite 1202](#) »
« [Boston, MA 02116](#) »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101®-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201®-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

☐ The date of this Agreement.

☐ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« »] By the following date: « »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work	Substantial Completion Date

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item	Price	Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:

(Identify each allowance.)

Item	Price

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)

§ 4.5 Liquidated damages, if any:

(Insert terms and conditions for liquidated damages, if any.)

« »

§ 4.6 Other:

(Insert provisions for bonus or other incentives, if any, that might result in a change to the Contract Sum.)

« »

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Architect determines, in the Architect's professional judgment, to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)

« »

§ 5.1.7.1.1 The following items are not subject to retainage:
(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

<< >>

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as follows:
(If the retainage established in Section 5.1.7.1 is to be modified prior to Substantial Completion of the entire Work, including modifications for Substantial Completion of portions of the Work as provided in Section 3.3.2, insert provisions for such modifications.)

<< >>

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:
(Insert any other conditions for release of retainage upon Substantial Completion.)

<< >>

§ 5.1.8 If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201–2017.

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201–2017, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

<< >>

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

<< >> % << >>

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Architect will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

<< >>

<< >>

<< >>
<< >>

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as follows:

(Check the appropriate box.)

☐ [<< >>] Arbitration pursuant to Section 15.4 of AIA Document A201–2017

☐ [<< >>] Litigation in a court of competent jurisdiction

☐ [<< >>] Other (Specify)

<< >>

If the Owner and Contractor do not select a method of binding dispute resolution, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2017.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor a termination fee as follows:

(Insert the amount of, or method for determining, the fee, if any, payable to the Contractor following a termination for the Owner's convenience.)

<< >>

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2017.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

<< >>
<< >>
<< >>
<< >>
<< >>
<< >>

§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

<< >>
<< >>
<< >>
<< >>
<< >>
<< >>

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, Exhibit A, Insurance and Bonds, and elsewhere in the Contract Documents.

§ 8.5.2 The Contractor shall provide bonds as set forth in AIA Document A101™–2017 Exhibit A, and elsewhere in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

<< >>

§ 8.7 Other provisions:

<< >>

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

(Insert the date of the E203-2013 incorporated into this Agreement.)

<< >>

- .5 Drawings

Number	Title	Date

- .6 Specifications

Section	Title	Date	Pages

- .7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document E204™-2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

- 9 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™-2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor's bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)

« »

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

« »« »

(Printed name and title)

CONTRACTOR (Signature)

« »« »

(Printed name and title)

DRAFT AIA® Document A201® – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

« Hanover Street Garage Restoration »
« Bid # 21-22 »

THE OWNER:

(Name, legal status and address)

« City of Portsmouth » « »
« Department of Public Works
Portsmouth, NH 03801 »

THE ARCHITECT:

(Name, legal status and address)

Walker Consultants « »
« 20 Park Plaza, Suite 1202 »
« Boston, MA 02116 »

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ADDITIONS AND DELETIONS:

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This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, *Guide for Supplementary Conditions*.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors. The Term Project as used herein shall mean: **Hanover St Garage Restoration Portsmouth, NH.**

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials. The Term Project Manual as used herein shall mean: A volume assembled for the Work which may include the bidding requirements, sample forms, Conditions of the Contract and Specifications.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.1.8 Engineer

Terms Engineer and Architect as used herein shall be synonymous. Term Engineer as used herein shall mean: Walker Consultants 20 Park Plaza Suite 1202, Boston, MA 02116.

§ 1.1.10 Unit Price Work

Unit Price Work is Work to be paid for on basis of unit prices.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.2.4 In preparation of Drawings and Specifications, Engineer has relied upon:

1. Following drawings of physical conditions in or relating to existing surface and subsurface structures:
An electronic copy (PDF) of original construction drawings are on file with Walker for the original and the expanded construction for this garage. However, the limited number of drawings for the 1985 construction were not identified as "As-Built" drawings. The following information related to documentation origin is as follows:

October 1999 – 100% Submittal Drawings for: "City of Portsmouth High-Hanover Parking Facility Expansion Portsmouth, New Hampshire" by the Maguire Group Inc. Architects/Engineers/Planners Portsmouth, NH., and Reed & Reed, Inc., Woolwich, ME. The drawing set included: Civil, Architecture, Structural, Plumbing, and Electrical drawings.

February 1984 – Construction Drawings (limited set) for: "Parking Facility High and Hanover Streets for the City of Portsmouth, New Hampshire" by Wright Pierce Architects & Engineers Portsmouth, NH. Drawings were limited to: Site Plan F-2, Structural drawings: S-2,4,6,7,8,10,11,12,14; Architectural A-1,3,5,7,9,11,13,15; Electrical E-2,4; Plumbing P-1,3; Civil C-1,3,4,6; Foundation F-3,4,6,8,10.

2. Copies of these Drawings may be examined at during regular business hours. These reports and Drawings are not part of Contract Documents, but technical data contained therein upon which Contractor is entitled to rely as identified and established above, are incorporated therein by reference.

§ 1.2.5 Reference to standard specifications, manuals, or codes of any technical society, organization, or association, or to laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean latest standard specification, manual, code, laws, or regulations in effect at time of opening of Bids (or, on Effective Date of Agreement if no Bids), except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual, or code (whether or not specifically incorporated by reference in Contract Documents) shall be effective to change duties and responsibilities of Owner, Contractor, or Architect, or any of their consultants, agents, or employees from those set forth in Contract Documents, nor shall be effective to assign to Architect, or any of Architect's consultants, agents, or employees, any duty or authority to supervise or direct furnishing or performance of Work, or any duty or authority to undertake responsibility contrary to General Conditions.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity, the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect’s consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party’s sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term “Owner” means the Owner or the Owner’s authorized representative.

Term Owner as used herein shall mean: City of Portsmouth New Hampshire.

§ 2.1.2 The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 Evidence of the Owner's Financial Arrangements

§ 2.2.1 Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

§ 2.2.2 Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

§ 2.2.3 After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.4 Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 The Owner shall furnish the Contractor a copy of the Contract Documents.

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of applicable supplier except as otherwise provided in Contract Documents; but no provisions of any such instructions will be effective to assign to Architect, or any of Architect's consultants, agents, or employees any duty or authority to undertake responsibility contrary to General Conditions.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.4 After Contract has been executed, Owner and Architect will consider formal request for substitution of products in place of those specified only under conditions set forth in General Requirements (Division 1 of Specifications).

§ 3.4.5 By making requests for substitutions based on subparagraph 3.4.4 above, Contractor:

1. Represents that Contractor has personally investigated proposed substitute product and determined that it is equal or superior in all respects to that specified.
2. Represents that Contractor will provide same warranty for substitution that Contractor would for that specified.
3. Certifies that cost data presented is complete and includes all related costs under this Contract except Architect's redesign costs, and waives all claims for additional costs related to substitution which subsequently become apparent, and
4. Will coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects.

§ 3.4.6 Architect's decision of approval or disapproval of proposed substitution shall be final.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. Except where otherwise expressly required by applicable laws, ordinances, rules, regulations and lawful orders of public authorities, neither Owner nor Architect shall be responsible for monitoring Contractor's compliance with any applicable law, ordinance, rule, regulation and lawful order of public authorities.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly

provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for

completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

§ 3.10.2 The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals. If required by Architect, schedule of submittals shall be adjusted to provide workable arrangement for processing submittals

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors. Submittals made by Contractor which are not required by Contract Documents will be returned immediately with notation "Submittal Not Required No Review Performed".

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.12.11 Submission to Architect of Shop Drawings and samples approved by Contractor and review of said Shop Drawings and samples by Architect shall not constitute submission in writing or approval in writing of any deviation from requirements of Contract Documents unless the Contractor has specifically informed the Architect in writing of such deviation at the time of the submittal and the Contractor has received written approval or authorization in accordance with 3.12.8.

§ 3.12.12 Changes to Drawings and Specifications by means of Shop Drawings become responsibility of party initiating such changes.

§ 3.12.13 Submission to Architect of Shop Drawings and samples approved by Contractor and review of said Shop Drawings and samples by Architect shall not imply that any requirements of Contract Documents have been waived or superseded.

§ 3.12.14 No delay or omission to exercise any right or remedy accruing to Architect upon any breach or event of default of Contractor shall impair any such right or remedy to be construed to be waiver of any such breach or default; nor shall any waiver of any single breach or default be deemed waiver of any other, prior, or subsequent

breach or default. Any waiver, permit, consent, or approval on part of Architect of any breach or default, or of any provision or condition hereof, must be in writing and shall be effective only to extent that such writing specifically sets forth.

§ 3.12.15 Architect's stamp on Shop Drawing shall not imply approval of quantities, dimensions, fabrication processes and techniques of construction, all of which shall remain responsibility of Contractor.

§ 3.12.16 Architect's stamp on Shop Drawing shall not relieve Contractor from responsibility for errors or omissions in Shop Drawing and shall not imply that Contractor may proceed in error.

§ 3.12.17 Shop Drawings and samples shall be submitted in accordance with procedures of Division 01, Section 'Submittal Procedures'.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 Access to Work

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death,

or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

§ 3.18.3 Contractor shall agree that total aggregate liability for consequential and incidental damages (but not direct damages) suffered with respect to professional negligence associated or connected with Drawings and Specifications from which Contractor prepared Contract Bid Price and for which Owner, Architect, and their agents or consultants may be liable, shall be limited to amount not to exceed \$100,000. Contractor shall further agree that with respect to each subcontractor, Contractor will obtain as condition precedent to subcontractor's performance, agreement that foregoing limitation of liability for consequential and incidental damages (but not direct damages) shall not in aggregate exceed \$100,000 for all Contractor's subcontractors. It is understood and agreed between parties hereto that this provision shall be confined in application to only those matters affecting Contract Bid Price and shall not affect any party's liability for personal injury or property damage arising or resulting from sole negligence of any party, its agents or employees.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 Architect is person or entity identified as such in Agreement and is referred to throughout Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

§ 4.2.15 Architect's terminology on Shop Drawing review stamp of "NO EXCEPTION TAKEN" shall mean that Architect has reviewed and approved Shop Drawing so stamped only for conformance with design concept of Project as given in Contract Documents.

§ 4.2.16 Architect's terminology on Shop Drawing review stamp of "MAKE CORRECTIONS NOTED – RESUBMITTAL NOT REQUIRED" shall mean that Architect has reviewed and approved Shop Drawing so stamped, subject to corrections made on Shop Drawing, only for conformance with design concept of Project as given in Contract Documents.

§ 4.2.17 Architect's terminology on Shop Drawing review stamp of "REJECTED" shall mean that Architect has not approved the Shop Drawing so stamped, subject to corrections made on Shop drawing and resubmittal is required.

§ 4.2.18 Architect's terminology on Shop Drawing review stamp of "REVISE AND RESUBMIT" shall mean that Architect has reviewed and not approved Shop Drawing, only for conformance with design concept of Project as given in Contract Documents and resubmittal is required.

§ 4.2.19 Architect's terminology in Shop Drawing review stamp of "SUBMITTAL NOT REQUIRED NO REVIEW PERFORMED" shall mean that submittal is not required by specification or resubmittal was not required and Architect has not reviewed the shop drawings.

§ 4.2.20 Unit Prices: Architect will review and approve actual quantities and determine classification of Unit Price Work performed by Contractor. Architect will review Contractor's preliminary determinations on such matters before rendering written decision thereon (by recommendation of Application for Payment or otherwise). Architect's written decisions thereon will be final and binding upon Owner and Contractor, unless, within ten days after date of any such decision, either Owner or Contractor delivers to other party to Agreement and to Architect written notice of intention to appeal from such decision.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

In accordance with Supplementary Instructions to Bidders, submit names of following subcontractors, suppliers, persons and organizations for approval by Owner and Architect before award of Contract:

TRADE	COMPANY	LOCATION
Concrete Demolition		
Ready-Mixed Concrete		
Concrete Reinforcement		
Concrete		
Masonry		
Structural Steel		
Protective Sealer		
Traffic Topping		
Expansion Joints		
Sealants and Caulking		
Control Joint Sealant		
Doors and Windows		
Structural Steel Painting		
Plumbing		
Fire Protection		
Electrical		

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract

agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 Increased or Decreased Work Item Quantities

Engineer shall have right under contract to make increases and decreases in quantities and changes in plans, as may be necessary to ensure completion of contemplated work subject to following qualifications:

As used herein, major item is defined as any item whose total cost, determined by multiplying constructed quantity and contract unit price, is equal to or greater than 5% of original total contract price. All other items are considered minor items and are not subject to unit price adjustment.

Where cost of final work prior to consideration of adjustment is within 5% of original total contract price, or if amount of adjustment is less than \$100, or if item is exempted from such adjustment elsewhere in contract, no adjustment in contract unit prices will be considered for any increased or decreased quantities.

Where cost of final work has increased more than 5% of original total contract price prior to consideration of any adjustment, requests for adjustments will be considered on following basis:

1. Where quantity of an item of work required to complete project is not increased nor decreased from original estimate by more than 25%, payment for quantity of said item will be made at contract unit price.
2. Where quantity of any major item of work is increased by more than 25%, then unit price for quantity of that item of work over 125% of original contract quantity will be decreased by 10% of unit price bid.
3. Where quantity of any major item of work is decreased by more than 25%, then adjusted unit price will be obtained by multiplying contract unit price for that item of work by factor obtained as follows:

$$\text{Factor} = 1 + (0.10 (P-C))/C$$

Where:

P = Contract Quantity

C = Constructed Quantity

In no case shall product of adjusted unit price and number of units of work performed exceed product of contract unit price and 75% of original contract quantity. Neither will unit price be adjusted to more than twice original contract unit price.

4. In special cases where adjustments provided by previous paragraphs in this subsection do not provide equitable remuneration for work required by change in quantities, Engineer may adjust contract unit prices prior to Notice of Award for portion of item affected, if justified by evidence presented by successful Bidder.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate

supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

1. Cost of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' or workmen's compensation insurance, plus 20% of sum thereof;
2. Cost of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed, plus 15% of sum thereof;
3. Rental costs of machinery and equipment, exclusive of hand tools, whether rented from Contractor or others, plus 15%;
4. Cost of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to Work, plus 15% of sum thereof;
5. Compensation as herein provided shall be accepted by Contractor as payment in full for extra Work done on this basis and said percentages shall cover profit, superintendence, general expense, overhead, and use of small tools and equipment for which no rental is allowed.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor’s control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s subsequent Applications for Payment. Progress payments on account of Unit Price Work will be based on number of units completed.

§ 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor’s right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers and shall reflect retainage if

provided for in the Contract Documents. Form of Application for Payment shall be notarized AIA Document G702, Application and Certification for Payment, supported by AIA Document G703, Continuation Sheet.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Until Substantial Completion, Owner shall pay 90% of amount due Contractor on account of progress payments.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.3.4 Unit Price Work

1. Where Contract Documents provide that all or part of Work is to be Unit Price Work, initially Contract Sum will be deemed to include for all Unit Price Work amount equal to sum of established unit prices for each separately identified item of Unit Price Work times estimated quantity of each item as indicated in Agreement. Estimated quantities of items of Unit Price Work are not guaranteed and are solely for purpose of comparison of Bids and determining initial Contract Sum. Review and approval of actual quantities and classifications of Unit Price Work performed by Contractor will be by Architect in accordance with SC 4.2, subparagraph 4.2.20.
2. Each unit price will be deemed to include amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
3. Where quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from estimated quantity of such item indicated in Agreement and there is no corresponding adjustment with respect to any other item of Work and if Contractor believes Contractor has incurred additional expense as result thereof, Contractor may make claim for increase in Contract Sum in accordance with Article 7 if parties are unable to agree as to amount of any such increase.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount

certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents. Payment shall be sufficient to increase total payments to 100% of Contract Sum, less such amounts as Architect shall determine for incomplete Work and unsettled claims.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or

encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

§ 9.11.1 Contractor and Contractor's surety, if any, shall be liable for and shall pay Owner sums hereinafter stipulated as liquidated damages for each calendar day of delay until Work is substantially complete:

The amount of compensation shall be the equivalent of parking per day times the amount of parking spaces out of service for parking due to the contractor's work (Daily Rate times number of parking spaces out of service due to construction).

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the

Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.1.5 Other Requirements

1. Owner reserves right to request complete copies of policies if deemed necessary to ascertain details of coverage not provided by certificates. Such policy copies shall be "Originally Signed Copies," and so designated.
2. Qualification of Insurers: In order to determine financial strength and reputation of insurance carriers, all companies providing coverages required shall have financial rating not lower than XII and policyholder's service rating no lower than A as listed in A.M. Best's Key Rating Guide, current edition. Companies with ratings lower than A: XII will be acceptable only upon written consent of Owner.
3. Subrogation Clause: Following subrogation clause shall appear in all policies of insurance, "Subrogation Clause": It is hereby stipulated that this insurance shall not be invalidated should insured waive in writing prior to loss any or all right of recovery against any party for loss occurring to property described herein.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

§ 11.2.2 Failure to Purchase Required Property Insurance. If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance. Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Contractor and Architect are protected by the provisions of section 15.1.7.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and

Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

§ 15.1.2 Time Limits on Claims

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

§ 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and

- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Owner will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.4 Consolidation or Joinder

§ 15.4.1 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations

to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as those of the Owner and Contractor under this Agreement.

DRAFT

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Payment Bond

CONTRACTOR:

(Name, legal status and address)

« »« »
« »

SURETY:

(Name, legal status and principal
place of business)

« »« »
« »

OWNER:

(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

« »
« »

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this Bond:



None



See Section
18

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

SURETY

Company: (Corporate
Seal)

Signature:

Name and « »« »

Title:

Signature:

Name and « »« »

Title:

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

« »
« »
« »

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other
party:)

« »
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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

- .1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
- .2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- .1 the name of the Claimant;
- .2 the name of the person for whom the labor was done, or materials or equipment furnished;
- .3 a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- .4 a brief description of the labor, materials or equipment furnished;
- .5 the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- .6 the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- .7 the total amount of previous payments received by the Claimant; and
- .8 the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature:

Name and Title: « »« »

Address: « »

SURETY

Company: (Corporate Seal)

Signature:

Name and Title: « »« »

Address: « »

DRAFT AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:

(Name, legal status and address)

« »« »
« »

SURETY:

(Name, legal status and principal
place of business)

« »« »
« »

OWNER:

(Name, legal status and address)

« »« »
« »

CONSTRUCTION CONTRACT

Date: « »

Amount: \$ « »

Description:

(Name and location)

« »
« »

BOND

Date:

(Not earlier than Construction Contract Date)

« »

Amount: \$ « »

Modifications to this
Bond:

« »

None

« »

See Section 16

CONTRACTOR AS PRINCIPAL

Company: (Corporate Seal)

Signature:

Name and « »« »

Title:

SURETY

Company: (Corporate Seal)

Signature:

Name and « »« »

Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or BROKER:

« »
« »
« »

OWNER'S REPRESENTATIVE:

(Architect, Engineer or other party:)

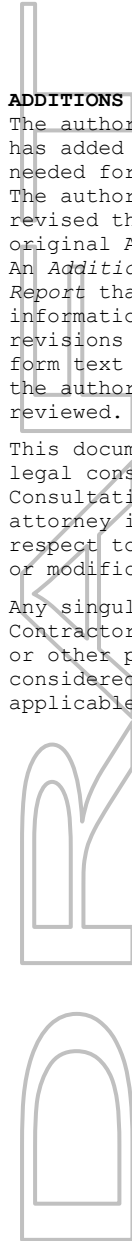
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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.



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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- .1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- .2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- .3 the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- .1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- .2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- .1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- .2 additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- .3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 **Balance of the Contract Price.** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 **Construction Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 **Contractor Default.** Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

« »

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: « »« »

Address: « »

SURETY

Company: _____ (Corporate Seal)

Signature: _____

Name and Title: « »« »

Address: « »

SECTION 01 11 10 - SUMMARY OF WORK - RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 PROJECT DESCRIPTION

- A. Work will be performed at locations within parking garage as shown on Drawings titled "Hanover St. Garage Restoration Portsmouth, NH."
- B. Work required in these areas and estimated quantities are listed on Bid Form. Bid Quantities associated with Work Items listed on Drawings have been estimated and are subject to measurement as defined in Article "Measurements." Where additional Work Items are described, but not specifically located and/or shown on Drawings, Contractor shall be responsible for locating and field marking all areas to be repaired. Owner and/or Engineer/Architect reserves right to increase or decrease quantities up to 25% at same unit cost, as required by job conditions. Unit costs will be established in accordance with Supplementary Conditions, Article "Changes" for quantity variations exceeding 25%.
- C. Work Item specifications and details shall govern all repair operations. Locations where Work Items apply are shown on Drawings as symbols.
- D. Final payment shall be made on basis of actual approved Work performed as measured in place.
- E. Project consists of providing all materials, labor, equipment, shoring engineering, supervision and services required to perform structural concrete repairs to the concrete topping, precast filigree planks, stairs, and landings. floor drainage repairs, joint sealant installation/replacement, expansion joint seal replacement, application of traffic bearing waterproofing membrane system, structural steel framing repairs, painting of steel framing, masonry wall repairs and reconstruction, traffic striping, and other miscellaneous work that is to be performed in the City of Portsmouth Hanover Street Parking Garage over construction phased project to be completed over a 3-Year period in accordance with the Contract Documents.
- F. Bids will be received and a single contract awarded for project work for year 2022. Owner will also receive bid pricing for the 2 remaining years and may at their option elect to extend the intent of award for all three years, therefore bid form for years 2023 and 2024 are to be completed and submitted for consideration. The 2023 and 2024 bid form pricing and work may also be given consideration by the City following the completion of the project work in 2022.

1.3 MEASUREMENTS

- A. Before ordering any material or doing any Work, Contractor shall verify all measurements at Project site and shall be responsible for correctness of same.
- B. Before proceeding with each Work Item, Contractor shall locate, mark, and measure quantity of each item and report quantities to Engineer/Architect. If measured quantities exceed Engineer/Architect's estimate, Contractor shall obtain written authorization to proceed from Owner before executing Work required for that Work Item.
- C. Measurement of quantities for individual Work Items will be performed by Contractor and reviewed by Engineer/Architect. Coordinate measurements with inspection as required in Section "Project Management and Coordination."
- D. Cost of Work included in each Work Item for quantities as indicated in Contract Documents shall be included in Base Bid.
 - 1. Additions to or deductions from lump sum price for quantities of each Work Item added to or deducted from Work respectively shall be at unit prices indicated in Bid Form and shall constitute payment or deductions in full for all material, equipment, labor, supervision and incidentals necessary to complete Work.

1.4 WORK SEQUENCE

- A. The construction documents provide a conceptual construction phasing sequence for planned work to be completed over a 3-year period. Prior to commencement of work, contractor shall meet with Engineer/Architect and Owner representatives to review the proposed construction phasing sequence and the contractors construction traffic management plan to determine the operational conditions of the garage during construction. Any adjustments to the phasing will be presented for approval before the start of work.
- B. Contractor shall give Owner notice of areas to be cleared of cars at least 2 working days in advance of actual Work.
- C. Contractor shall notify Owner's representative at least 24 hr. prior to beginning any demolition work.
- D. Contractor shall remove all broken concrete and debris from Work area on daily basis and dispose of same at authorized dump sites.
- E. Contractor shall remove dust and air transported sand/debris from remainder of facility at conclusion of operations in Work area.

1.5 CONTRACTOR USE OF PREMISES

- A. General: During construction period Contractor shall have limited use of the garage within the enclosed work and safe zones areas during construction operations.

Contractor's use of premises is limited only by Owner's right to operate and maintain the garage with its own forces or to employ separate contractors on portions of project.

- B. General: Limit use of premises to construction activities in areas indicated; allow for pedestrian and vehicular access by the Owner and the general public.
 - 1. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.
 - 2. Keep driveways and entrances and streets serving the premises clear and available to the Owner and Owner's employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.
 - 3. Burial of Waste Materials: Prior to final grading and landscape development, existing grade depression near the southwest corner of site, as indicated, may be used for disposal of inert waste material from construction process. Do not dispose of organic and hazardous material on site, either by burial or by burning.
- C. Contractor's use of premises shall not interfere with operation of same. Elevators shall not be used for transfer of materials or equipment.
- D. Contractor's debris removal path shall be over non-repaired services unless physical restraints prevent use of such path.
- E. Contractor shall confine its apparatus, materials, equipment, tool cribs, field offices and operations to areas designated by Owner and/or Engineer/Architect. Premises shall not be unreasonably encumbered with materials and equipment. Neat and orderly stockpiling and other operations shall be maintained and debris shall be regularly removed from site. **Contractor shall not load or permit any part of structure to be loaded with weight that will endanger structural integrity or safety of facility. Contractor shall limit axle loads to maximum 4000 lb per axle and gross weight of 8000 lb, or stockpiling of materials and equipment to 40 lb per sq ft. Contractor to note existing height restrictions within parking structure.**
- F. Contractor Parking: Contractor's employees shall park within confines of work area or pay prevailing parking rates.
- G. On-Site Storage: Contractor shall not store materials or equipment at site of Work for more than one week prior to time that materials or equipment are incorporated into Work.

1.6 BARRICADES

- A. Provide positive barricading to separate Work areas from areas open to public and to prevent the need for washing cars parked adjacent to the work area. Minimum acceptable separation full height solid temporary barrier constructed of wood or concrete and provided with sound deadening material. Provide additional barriers and falsework as required to prevent damage to vehicle due to airborne debris. See "Temporary Facilities" for additional requirements.

1.7 TRAFFIC OFFICERS AND FLAGMEN

- A. When, in Owner's opinion, it is necessary that uniformed police or security officers be used to protect and control pedestrian traffic, to direct vehicular traffic during construction and to keep traffic off any part of Work, or to protect public safety, a police/security detail will be obtained. All expenses for uniformed officers shall be assumed and paid for by the Contractor and included in bid price or in prices bid for items of Work to be performed under this Contract.

1.8 CLAIMS

- A. Contractor shall promptly address all damages claims. Owner reserves right to resolve any claims not addressed by Contractor within 3 wks after claim is received by Contractor. Any amounts paid by Owner will be deducted from Contractor's next progress payment.

1.9 OWNER OCCUPANCY

- A. Partial Owner Occupancy: Owner reserves the right to occupy and to place and install equipment in completed areas of building, prior to Substantial Completion provided that such occupancy does not interfere with completion of Work. Such placing of equipment and partial occupancy shall not constitute acceptance of total Work.
 - 1. Substantial Completion will be executed for each specific portion of Work to be occupied prior to Owner occupancy.
 - 2. Prior to returning floor areas to service and occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

END OF SECTION 01 11 10

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SECTION 01 21 00 – ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements governing handling and processing allowances.
 - 1. Selected materials and equipment, and in some cases, their installation are shown and specified in Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. Additional requirements, if necessary, will be issued by Change Order.
- B. Types of allowances required include following:
 - 1. Construction allowances.
- C. Procedures for submitting and handling Change Orders are included in Division 01 Section "Contract Modification Procedures."

1.3 DEFINITIONS

- A. Allowance is a quantity of work or dollar amount established in lieu of additional requirements, used to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

1.4 SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.
- B. Submit invoices or delivery slips to indicate actual quantities of materials delivered to site for use in fulfillment of each allowance.
- C. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

- D. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 CONSTRUCTION ALLOWANCES

- A. Use contingency allowance only as directed for Owner's purposes, and only by Change Orders which designate amounts to be charged to the allowance.
- B. Contractor's **overhead, profit, and** related costs for products and equipment ordered by Owner under the construction allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit.
- D. At Project closeout, credit unused amounts remaining in the construction allowance to Owner by Change Order.

1.6 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other markups.
 - 3. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of Work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

1.7 UNUSED MATERIALS

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement. Inspect products covered by an allowance promptly upon delivery for damage or defects.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related construction activities.

3.3 SCHEDULE OF ALLOWANCES

- A. **Structural Steel Repair Allowance:** Include the amount of \$15,000 to cover costs to clean corrosion from structural framing where designated and assist the Engineer in determining field conditions relevant to repair work. Allowance costs shall include scaffolding access, cleaning and field preparation, for Engineers measurements. Fabrication and installation of the repair work shall be in accordance to work item Detail Series WI 46.0 as shown on the drawings with contractors costs to include all permits, fees, equipment, materials, incidentals, and labor used in the process.
- B. Costs of testing and inspection services not required by the Contract Documents are not included in the allowance.
- C. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

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SECTION 01 23 00 – ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by Bidders and stated on the Bid Form for certain work defined in Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept corresponding change either in the amount of construction to be completed, or in products, materials, equipment, systems or installation methods described in Contract Documents.
1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted alternate is complete and fully integrated into project.
1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of Contract, prepare and distribute to each party involved notification of status of each alternate. Indicate whether alternates have been accepted, rejected or deferred for consideration at later date. Include complete description of negotiated modifications to alternates.

- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: Schedule of alternates is included at end of this Section. Specification Sections referenced in Schedule contain requirements for materials and methods necessary to achieve Work described under each alternate.

PART 2 - PRODUCTS (NOT APPLICABLE).

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No. 1:

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SECTION 01 26 00 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing the handling and processing of allowances.
 - 2. Division 01 Section "Submittal Procedures" for requirements for Contractor's Construction Schedule.
 - 3. Division 01 Section "Payment Procedures" for administrative procedures governing applications for payment.

1.3 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: **Engineer** will provide proposed changes in Work that will require adjustment to Contract Sum or Contract Time will be issued by Engineer, with detailed description of proposed change and supplemental or revised Drawings and Specifications, if necessary.
 - 1. Work Change Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 7 days, when not otherwise specified, 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 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 statement indicating effect proposed change in Work will have on Contract Time.

- B. Contractor-Initiated Change Order Proposal Requests: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer.
 - 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. Submit request no later than 10 working days after discovery of condition.
 - 6. 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.
 - 7. Comply with requirements in Division 01, Section "Contract Modification Procedures" if the proposed change requires substitution of one product or system for product or system specified.
- C. Proposal Request Form: Use AIA Document G709 or form acceptable to Engineer.

1.4 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Division 01, Section "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.

1.5 CHANGE ORDER PROCEDURES

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

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Engineer 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 APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

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SECTION 01 29 00 - 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. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Division 01 Section "Allowances" for procedural requirements governing handling and processing of allowances.
 - 2. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 3. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with items required to be indicated as separate activities in Contractor's construction schedule, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - 2. Submit the Schedule of Values to Engineer 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 the 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. Name of Engineer.
 - c. Engineer's project number.
 - d. Contractor's name and address.
 - e. 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:
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts in excess of five percent of the Contract Sum.
5. 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. Include evidence of insurance or bonded warehousing if required.
6. 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.
7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
9. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
10. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.4 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 Engineer and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

1. Submit draft copy of Application for Payment seven days prior to due date for review by Engineer.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 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. Engineer 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 of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 3. 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 [1] signed and notarized original copy of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. 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 subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 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 Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
 - a. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit waivers of lien on forms, executed in a manner 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. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Construction Traffic Management Plan
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- I. Application for Payment at Substantial Completion: After issuing 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 Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: 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. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."

6. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
7. Final, liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

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SECTION 01 31 00 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - ENERAL

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. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. RFIs.
 - 3. Project meetings.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
 - 2. Division 01 Section "Execution" for procedures for coordinating general installation and field-engineering services.
 - 3. Division 01 Section "Closeout Procedures" for coordinating Contract closeout.

1.3 DEFINITIONS

- A. RFI: Request for Information. Request from Owner, Engineer, 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, telephone number, and email address 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 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. Post copies of list in project meeting room, or temporary field office, in prominent location in the facility. Keep list current at all times.

1.5 COORDINATION

- A. Coordination: Coordinate construction operations included in various 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.
- B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with 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 with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
- C. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 1. Preparation of Contractor's construction schedule.
 2. Preparation of Contractors Traffic Management Plan and Traffic Signage.
 3. Preparation of the schedule of values.
 4. Installation and removal of temporary facilities and controls.
 5. Delivery and processing of submittals.
 6. Progress meetings.
 7. Preinstallation conferences.
 8. Project closeout activities.
- E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.6 SUBMITTALS

1.7 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Engineer will return without response those RFIs submitted to Engineer by other entities controlled by Contractor.
 - 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 Engineer.
 - 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 or software-generated form with substantially the same content as indicated above, acceptable to Engineer.
 - 1. Attachments shall be electronic files in PDF format.
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven working days for Engineer's response for each RFI. RFIs received by Engineer 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 Engineer's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt by Engineer for additional information.
 3. Engineer'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 Division 01, Section "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 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 Use software log with not less than the following:]
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Engineer
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Engineer's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Engineer's Data Files Not Available: Engineer will not provide Engineer's Revit model or digital data files for Contractor's use during construction.
1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
- B. Web-Based Project Software: Provide, administer, and use web-based Project software site for purposes of hosting and managing Project communication and documentation until Final Completion. (Optional)
1. Web-based Project software site includes, at a minimum, the following features:

- a. Compilation of Project data, including Contractor, subcontractors, Engineer, engineer's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.
 2. Provide a web-based Project software user licenses for use of Owner, Engineer, and Engineer's consultants. Provide 4 hours of software training at Engineer's office for web-based Project software users.
 3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Engineer. Provide data in locked format to prevent further changes.
 - a. Autodesk; Buzzsaw.
 - b. Newforma, Inc.
 - c. Procore Technologies, Inc.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Engineer, prepare 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.
 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Engineer of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Engineer, within three days of the meeting.
- B. Preconstruction Conference: Engineer will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Engineer, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for disruptions and shutdowns.
 - u. Construction waste management and recycling.
 - v. Parking availability.
 - w. Storage areas.
 - x. Equipment deliveries and priorities.
 - y. First aid.
 - z. Security.
 - aa. Progress cleaning.

- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Engineer of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Possible conflicts.
 - i. Compatibility requirements.
 - j. Time schedules.
 - k. Weather limitations.
 - l. Manufacturer's written instructions.
 - m. Warranty requirements.
 - n. Compatibility of materials.
 - o. Acceptability of substrates.
 - p. Temporary facilities and controls.
 - q. Regulations of authorities having jurisdiction.
 - r. Testing and inspecting requirements.
 - s. Installation procedures.
 - t. Coordination with other work.
 - u. Required performance results.
 - v. Protection of adjacent work.
 - w. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- A. Project Closeout Conference: a project closeout conference, at a time convenient to Owner and Engineer, but no later than 45 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other

- concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Responsibility for removing temporary facilities and controls.
- A. Progress Meetings: Conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Off-site fabrication.
 - 5) Access.
 - 6) Site use.
 - 7) Temporary facilities and controls.

- 8) Progress cleaning.
 - 9) Quality and work standards.
 - 10) Status of correction of deficient items.
 - 11) Field observations.
 - 12) Status of RFIs.
 - 13) Status of Proposal Requests.
 - 14) Pending changes.
 - 15) Status of Change Orders.
 - 16) Pending claims and disputes.
 - 17) Documentation of information for payment requests.
4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 31 00

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SECTION 01 32 00 - 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. This 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.
 - 2. Unusual event reports.
- B. Related Sections include the following:
 - 1. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
 - 3. Division 01 Section "Quality Control" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical activities are activities on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor activity is an activity that precedes another activity in the network.
 - 3. Successor activity is an activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Engineer.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest continuous chain of activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- E. Event: The starting or ending point of an activity.
- F. Milestone: A key or critical point in time for reference or measurement.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file, where indicated.
 - 2. PDF file.
 - 3. Two paper copies, of sufficient size to display entire period or schedule, as required.
- B. Construction Schedule Updating Reports: Submit with Application for Payment
- C. Unusual Event Reports: Submit at time of unusual event.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
 - 1. Use Microsoft Project, Primavera, Meridian Prolog, Scheduling component of Project website software specified in Division 01, Section "Project Management and Coordination for current Windows operating system.
- B. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
 - 1. In-House Option: Owner may waive requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
 - 2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C. Time Frame: Extend schedule from date established 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.
 - 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 3. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
 - 4. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 5. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Partial occupancy areas
 - d. Entry exit areas
 - e. Use of premises restrictions.
 - f. Environmental control.
 6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Submittals.
 - b. Fabrication.
 - c. Deliveries.
 - d. Installation.
 - e. Tests and inspections.
- E. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules 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.

1.6 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 30 days of date established for Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.7 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
 2. Approximate count of personnel at Project site.
 3. Equipment at Project site.
 4. Material deliveries.
 5. High and low temperatures and general weather conditions, including presence of rain or snow.
 6. Testing and inspection.
 7. Accidents.
 8. Meetings and significant decisions.
 9. Unusual events.
 10. Stoppages, delays, shortages, and losses.
 11. Meter readings and similar recordings.
 12. Emergency procedures.
 13. Orders and requests of authorities having jurisdiction.
 14. Change Orders received and implemented.
 15. Construction Change Directives received and implemented.
 16. Services connected and disconnected.
17. Submit unusual event reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

END OF SECTION 01 32 00

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SECTION 01 33 00 - 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. This 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. Division 01 Section "Payment Procedures" For submitting Applications for Payment and the schedule of values.
 - 2. Division 01 Section "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
 - 3. Division 01 Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Division 01 Section "Quality Requirements" for submitting test and inspection reports and schedule of tests and inspections.
 - 5. Division 01 Section "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 6. Division 01 Section "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 Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's approval. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBMITTAL SCHEDULE

- 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 Engineer 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. 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.
 3. Format: Arrange the following information in a tabular format:
 - a. Specification Section number and title.
 - b. Submittal category: Action; informational.
 - c. Name of subcontractor.
 - d. Description of the Work covered.
 - e. Scheduled date for Engineer's final release or approval.
 - f. Scheduled date of fabrication.
 - g. Scheduled dates for installation.

1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of Engineer.
 4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Remarks.
 14. Signature of transmitter.
- B. Options: Identify options requiring selection by Engineer.

- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Engineer on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- E. Submittals for Web-Based Project Software: Prepare submittals as PDF files, or other format indicated by Project software website.

1.6 SUBMITTAL PROCEDURES

- A. Engineer's Digital Data Files: Electronic digital data files of the Contract Drawings will **not** be provided by Engineer for Contractor's use in preparing submittals.
- B. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Email: Prepare submittals as PDF package, and transmit to Engineer by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Engineer.
 - a. Engineer will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
 - 2. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
- C. 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. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer'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. Engineer 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.

Cast-In-Place Concrete
Trowel Applied Mortar
Traffic Coatings
Expansion Joint Seals
Concrete Joint Sealants
High Performance Coatings
Basic Mechanical Requirements
Basic Mechanical Materials And Methods
Fire Protection
Plumbing Systems
Basic Electrical Requirements
Basic Electrical Materials And Methods

- E. Resubmittals: Engineer will review each of Contractor's submittals the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer's services made necessary to review such additional resubmittals. Owner will in turn reimburse Engineer.
1. Make resubmittals in same form and number of copies as initial submittal.
 - a. Note date and content of previous submittal.
 - b. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - c. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
- F. 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.
- G. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.

2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. Submit Product Data before Shop Drawings, and before or concurrent with Samples.
- 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. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
 4. Web-Based Project Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.

5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Engineer will retain **two** Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- D. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and owners, and other information specified.
- E. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

F. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

G. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.

- c. Time period when report is in effect.
- d. Product and manufacturers' names.
- e. Description of product.
- f. Test procedures and results.
- g. Limitations of use.

1.8 REQUESTS FOR INFORMATION

- A. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
- B. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
- C. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.9 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Project Closeout and Maintenance Material Submittals: See Requirements in Division 01 Section "Closeout Procedures."
- C. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.
 - 1. Engineer will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer or its subconsultant will review each submittal, make marks to indicate corrections or revisions required, and return it.
 - 1. PDF Submittals: Engineer will indicate, via markup on each submittal, the appropriate action.
 - a. See Division 00, Section "Supplementary Conditions" for description of terminology on Engineer's Stamp applied via markup to each submittal.

- b. See Division 00, Section "Supplementary Conditions" for description of terminology on Engineer's Stamp.
- 2. Submittals by Web-Based Project Software: Engineer will indicate, on Project software website, the appropriate action.
 - a. Actions taken by indication on Project software website have the following meanings:
 - 1) See Division 00, Section "Supplementary Conditions" for description of terminology on Engineer's Stamp.
- C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Engineer.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- F. Engineer will discard submittals received from sources other than Contractor.
- G. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 33 00

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SECTION 01 40 00 - QUALITY CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for quality control services.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.
- C. Related Requirements:
 - 1. Division 01 Section "Allowances" for testing and inspection allowances.
 - 2. Division 01 Section "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

- C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Engineer.

1.4 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements are specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Engineer for direction before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Engineer for a decision before proceeding.

1.5 ACTION SUBMITTALS

- A. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.6 INFORMATIONAL SUBMITTALS

- A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports and documents as specified.
- D. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.7 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager [may also serve as Project superintendent] [shall not have other Project responsibilities].
- B. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.

- C. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 - 3. Owner-performed tests and inspections indicated in the Contract Documents[, including tests and inspections indicated to be performed by Commissioning Authority].
- D. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- E. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Engineer has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- F. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.10 RESPONSIBILITIES

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 2. Payment for these services will be made from testing and inspection allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspection will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.

5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Preliminary design mix proposed for use for material mixes that require control by testing agency.

6. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
 2. Distribution: Distribute schedule to Owner, Engineer, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections and as follows:
 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Engineer and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Engineer with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - EXECUTION

2.1 TEST AND INSPECTION LOG

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

1. Submit log at Project closeout as part of Project Record Documents.

2.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01 40 00

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SECTION 01 42 00 - REFERENCES

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 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and

effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 - 2. ACI - American Concrete Institute; (Formerly: ACI International); www.abma.com.
 - 3. AI - Asphalt Institute; www.asphaltinstitute.org.
 - 4. AIA - American Institute of Architects (The); www.aia.org.
 - 5. AISC - American Institute of Steel Construction; www.aisc.org.
 - 6. AISI - American Iron and Steel Institute; www.steel.org.
 - 7. ANSI - American National Standards Institute; www.ansi.org.
 - 8. ASCE - American Society of Civil Engineers; www.asce.org.
 - 9. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
 - 10. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
 - 11. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
 - 12. ASTM - ASTM International; www.astm.org.
 - 13. AWS - American Welding Society; www.aws.org.
 - 14. BIA - Brick Industry Association (The); www.gobrick.com.
 - 15. BICSI - BICSI, Inc.; www.bicsi.org.
 - 16. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
 - 17. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
 - 18. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.

19. FM Approvals - FM Approvals LLC; www.fmglobal.com.
20. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
21. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
22. IAS - International Accreditation Service; www.iasonline.org.
23. IAS - International Approval Services; (See CSA).
24. ICBO - International Conference of Building Officials; (See ICC).
25. ICC - International Code Council; www.iccsafe.org.
26. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
27. IEC - International Electrotechnical Commission; <http://www.iec.ch>.
28. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
29. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
30. IESNA - Illuminating Engineering Society of North America; (See IES).
31. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
32. ISO - International Organization for Standardization; www.iso.org.
33. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
34. NFPA - National Fire Protection Association; www.nfpa.org.
35. NFPA - NFPA International; (See NFPA).
36. NSPE - National Society of Professional Engineers; www.nspe.org.
37. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
38. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers;
39. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
40. UL - Underwriters Laboratories Inc.; www.ul.com.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. ICC - International Code Council; www.iccsafe.org.
2. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
 2. EPA - Environmental Protection Agency; www.epa.gov.
 3. FG - Federal Government Publications; www.gpo.gov/fdsys.
 4. GSA - General Services Administration; www.gsa.gov.
 5. OSHA - Occupational Safety & Health Administration; www.osha.gov.
 6. SD - Department of State; www.state.gov.
-
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
 2. FED-STD - Federal Standard; (See FS).
 3. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 4. USAB - United States Access Board; www.access-board.gov.
 5. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 42 00

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SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

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 temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Division 01, Section "Summary of "Work" for work restrictions and limitations on utility interruptions.
 - 2. Division 01, Section "Temporary Facilities and Controls" for responsibilities for temporary facilities and controls for projects utilizing multiple contracts.

1.3 USE CHARGES

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

1.4 INFORMATIONAL SUBMITTALS

- A. Contractors Traffic Management Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

- B. Implementation and Termination Schedule: Within 15 days of date established for commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- C. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- E. Dust- and Ventilation Control Plan: Submit coordination drawing and narrative that indicates the dust- and ventilation control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control and sound deadening partitions at each phase of work.
 - 2. Ventilation system for work zones.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.

1.5 QUALITY ASSURANCE

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

1.6 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Wood Enclosure/Partitions: Plywood, full height floor to floor, framed with four 2-by-4-inch rails, with fire treated plywood and studs and insulated for sound deadening.

- B. Insulation: polyisocyanurate or XPS foam board insulation as shown on construction phasing drawing.

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Engineer and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 6 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no fewer than one receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack and marker boards.
 - 3. Drinking water and private toilet.
 - 4. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F .
 - 5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- B. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01 Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
- B. Water Service: Connect to Owner's existing water service facilities. Clean and maintain water service facilities in a condition acceptable to Owner. At Substantial Completion, restore these facilities to condition existing before initial use.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- D. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 - 1. Prior to commencing work, isolate the ventilation in area where work is to be performed.
 - a. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.

2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 2. At field office, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.
 - e. Architect's office.
 - f. Engineers' offices.
 - g. Owner's office.
 - h. Principal subcontractors' field and home offices.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 3. Maintain and touch up signs so they are legible at all times.
- H. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing equipment, structures, utilities, and other improvements at Project site except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 1. Comply with work restrictions specified in Division 01 Section "Summary of Work."
- C. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- F. Covered Walkway: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 1. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 2. Paint and maintain appearance of walkway for duration of the Work.
- G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.
- H. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.
 1. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 2. Insulate partitions to control noise transmission to occupied areas.
 3. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 4. Protect air-handling equipment.
 5. Provide walk-off mats at each entrance through temporary partition.

- I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

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

END OF SECTION 01 50 00

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SECTION 01 60 10 - PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling requests for substitutions made after award of Contract.
- B. Requests for substitution shall not be submitted by the contractor for products, materials, equipment or methods of construction when substitutions are not allowed by the technical specification sections.
- C. Related Requirements:
 - 1. Division 01 Section "Allowances" for products selected under an allowance.
 - 2. Division 01 Section "Reference Standards and Definitions" for applicability of industry standards to products specified
 - 3. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
- D. Engineer's policy is to reject requests for substitution unless paragraph "Substitutions" under Article "Definitions" applies. Vendors wishing inclusion in Engineer's master specification: contact Engineer for procedure.

1.3 DEFINITIONS

- A. Definitions used in this Article are not intended to change or modify meaning of other terms used in Contract Documents.
- B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by Contractor after award of Contract are considered requests for "substitutions." Following are not considered substitutions:
 - 1. Revisions to Contract Documents requested by Owner or Engineer.
 - 2. Specified options of products and construction methods included in Contract Documents.
 - 3. Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS

- A. Substitution Request Submittal: Requests for substitution will be considered if received within 7 days after commencement of Work. Requests received more than 14 days after commencement of Work may be considered or rejected at discretion of Engineer.
1. Submit 3 copies of each request for substitution for consideration. Submit requests on forms included at end of this Section and in accordance with procedures required for Change Order proposals.
 2. Identify product, or fabrication or installation method to be replaced in each request. Include Specification Section number and title and Drawing numbers and titles. Provide complete documentation showing compliance with requirements for substitutions, and the following information, as appropriate:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES .
 - j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 10 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.6 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.7 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 14 days prior to time required for preparation and review of related submittals.
1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience: Not allowed unless otherwise indicated.
- C. Contractor's submittal and Engineer's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

END OF SECTION 01 60 10

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REQUEST FOR SUBSTITUTION

To:

Attention:

From:

Name of Company

Address

City, State, Zip Code

Phone

Fully answer all information requested below. Failure to answer any item may cause rejection of request for substitution. If requested by Engineer, submit information about manufacturer and vendor history, financial stability, distribution and support systems. Use one form for each product requested. Only first product listed will be considered on forms with more than one product listed.

Specification Section Number: _____ Drawing Number: _____

Para Number: _____ Detail Number: _____

Specified Product: _____

Proposed Substitution: _____

Answer the following questions. Attach an explanation sheet on your company's letterhead when required.

Does the proposed substitution affect dimensions indicated on Drawings?

No _____ Yes _____ (If yes, explain below).

Does the proposed substitution require changes in Drawings and/or design or installation changes?

No _____ Yes _____

If yes, is the cost of these changes included in the proposed amount? No _____ Yes _____

Does the proposed substitution affect other trades? No _____ Yes _____

(If yes, explain who and how)

If the proposed product does affect the work of other trades, has the cost impact on their work been included in the price of the proposed substitution?

No _____ Yes _____

Does the proposed product's guarantee differ from that of the specified product's?

No _____ Yes _____ (If yes, explain below).

Why is this proposal for substitution being submitted? List reasons below.

Attach a listing of 3 projects using proposed substitution completed within the past 5 yrs in geographic and climatic region of Project. One of applications shall have been in service for at least 3 yrs.

Attach product data/brochures and Vendor Qualification Form for the specified and substitute product.

Undersigned has examined Construction Documents, is familiar with specified product, understands indicated application of product, and understands design intent of Engineer. Undersigned states that proposed substitution complies with Construction Documents and will perform at least equally to specified product within limitations stated above. Undersigned accepts responsibility for coordinating application and installation of proposed substitution and waives all claims for additional costs resulting from incorporation of proposed substitution into Project or its subsequent failure to perform according to specified requirements.

Submitted By: _____
Typed Signature

Date: _____

**Vendor Qualification Form
Walker Consultants**

1. Statement of Confidentiality:

Walker Consultants (Walker) will treat any information as confidential which is clearly labeled so. A "clear label" is defined as the word "Confidential" marked in red ink on each and every page desired confidential in letters no less than one half inch high. At most, only two Walker staff will have access to vendor information marked "Confidential", Brian Preston and his designate.

2. Statement of Walker's Commitment to Quality:

WALKER is committed to providing quality service to its clients. As part of this commitment, WALKER never makes a promise it cannot keep. WALKER requires the same commitment from its vendors, whether direct or indirect.

3. Statement of WALKER's Relationship to its Vendors:

Mutual trust is the relationship WALKER desires with all its vendors. Both WALKER and its vendors must realize that trust must be earned over time. Trust is easily damaged and sometimes impossible to recover.

4. Vendor's Organization:

For the product being considered, list the number of employees in:

_____	Product manufacture
_____	Product sales
_____	Product marketing
_____	Product R & D
_____	Product technical service
=====	TOTAL

5. Financial Stability:

Provide past 5 yrs sales history and current audited financial statement or equivalent documentation of financial stability.

6. Safety and Environment:

Define vendor policies.

7. Sales/Service Offices:

List all locations.

8. Geographic Markets:

List all areas served.

9. Products:

On (a) separate sheet(s) for each product, list product name, uses, length of time in service, test data. Provide Material Safety Data Sheet(s). Provide case history data of product use in 5 major projects within the last 2 yrs.

10. Quality Assurance:

Define manufacturing program. Define installation program.

11. Installation:

By manufacturer?	_____ Y	_____ N
By certified applicators?	_____ Y	_____ N
By approved applicators?	_____ Y	_____ N
By any applicator?	_____ Y	_____ N

12. Comments:

13. Standard Warranty:

Provide copy of terms.

14. References:

Provide three.

Signature: _____

Printed name: _____

Title: _____

Date: _____

Have this statement notarized.

Decision of Engineer regarding acceptance or rejection of proposed substitution will be based, at least in part, on information supplied above and in attached explanations and product data.

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SECTION 01 73 00 - 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. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Cutting and patching.
 - 3. Progress cleaning.
 - 4. Protection of installed construction.
- B. Related Requirements:
 - 1. Division 01 "Summary of Work" for limits on use of Project site.
 - 2. Division 01 Section "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 3. Division 01 Section "Submittal Procedures" for submitting surveys.
 - 4. Division 01 Section "Execution" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
 - 5. Division 01 Section "Closeout Procedures" and final cleaning.
 - 6. Division 02 Section "Work Items" for coordinating restoration construction activities to maintain Owner's operations during construction.

1.3 DEFINITIONS

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

1.4 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result

from cutting and patching work. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:

- a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.
2. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.5 INFORMATIONAL SUBMITTALS

- A. Cutting and Strip Removal Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.6 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 2. 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.
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.

- c. Fire-suppression systems.
 - d. Plumbing piping systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Electrical wiring systems.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety, Other construction elements include but are not limited to the following:
 - a. Membranes and flashings.
 - b. Exterior glazed wall construction.
 - c. Equipment supports.
 - d. Piping, and equipment.
 - 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- 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

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, mechanical and electrical systems, and other construction affecting the Work.
- 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 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. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 1. Description of the Work.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. 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 Engineer according to requirements in Division 01, Section "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 Engineer promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- C. 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.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 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.
- 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. Tools and Equipment: Where possible, select tools or equipment that minimize production of excessive noise levels
- F. 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 Engineer.
 - 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.
- G. 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.
- H. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Section "Closeout Procedures" for repairing or removing and replacing defective Work.

3.5 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. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. 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.
- 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.
- 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.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- G. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, and similar materials from adjacent finished surfaces.

3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- 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. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 - 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- 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 Division 01, Section "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.

3.7 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. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 73 00

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SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 2. Closeout requirements for specific construction activities are included in appropriate Sections in of the project manual and specifications.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at final completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificate of Insurance: For continuing coverage.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 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. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 2. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 3. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Engineer. Label with manufacturer's name and model number.
 - 4. Submit sustainable design submittals not previously submitted.
 - 5. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. 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, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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 Engineer, that must be completed or corrected before certificate will be issued.
 - 1. 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.

1.7 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 Division 01, Section "Payment Procedures."
 - 2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 4. Submit pest-control final inspection report.
 - 5. Submit final completion photographic documentation.

- 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, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer 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. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - a. Engineer will provide one repeat inspection under its contract with Owner. Subsequent inspections shall be at Contractor's expense.
 - b. Upon completion of reinspection, Engineer 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.
 - c. If necessary, reinspection will be repeated.

1.8 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,
 - 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 Engineer
 - d. Name of Contractor.
 - e. Page number.
 - 4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Engineer will return annotated file.
 - b. PDF electronic file. Engineer will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, 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.

- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Warranties in Paper Form:
 - 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.
- E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS (NOT APPLICABLE).

2.1 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.
 - 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. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - f. Sweep concrete floors broom clean in unoccupied spaces.
 - g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-

- obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
- h. Remove labels that are not permanent.
- i. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
- j. Leave Project clean and ready for occupancy.

2.2 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 01 77 00

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SECTION 01 78 39 - 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.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. Section "Multiple Contract Summary" for coordinating project record documents covering the Work of multiple contracts.
 - 2. Division 01, Section "Execution" for final property survey.
 - 3. Division 01, Section "Closeout Procedures" for general closeout procedures.
 - 4. See specifications sections for specific requirements for Project Record Documents in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit 1 set of marked-up Record Prints.
 - 2. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit 1 paper-copy set of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints and 1 of file prints.
 - 3) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit PDF electronic files of scanned record prints and 3 set(s) of prints.
 - 2) Print each drawing, whether or not changes and additional information were recorded.

- B. Record Specifications: Submit 1 annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit 1 of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. annotated PDF electronic files and directories of each submittal.
- E. Reports: Submit written report]indicating items incorporated into project record documents concurrent with progress of the Work, including revisions, concealed conditions, field changes, product selections, and other notations incorporated.

1.4 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 and unit quantity 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.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 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. Locations of concealed internal utilities.
 - d. Changes made by Change Order or Change Directive.
 - e. Changes made following Engineer/Architect's written orders.
 - f. Details not on the original Contract Drawings.
 - g. Field records for variable and concealed conditions.
 - h. Record information on the Work that is shown only schematically.
 - i. Actual location and quantity of unit price items of the Work.

3. Mark the Contract Drawings and Shop 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. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up Record Prints with Engineer/Architect. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file with comment function enabled.
 2. Incorporate changes and additional information previously marked on Record Prints. Delete, redraw, and add details and notations where applicable.
 3. Refer instances of uncertainty to Engineer/Architect for resolution.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 2. Format: Annotated PDF electronic file with comment function enabled.
 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Engineer/Architect
 - e. Name of Contractor.

1.5 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.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.

5. Note related Change Orders, Record Drawings, and record Drawings where applicable.
- B. Format: Submit record Specifications as annotated PDF electronic file or scanned PDF electronic file(s) of marked-up of Specifications].

1.6 RECORD PRODUCT DATA

- 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. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders and record Drawings, where applicable.
- C. Format: Submit record Product Data as annotated PDF electronic file, scanned PDF electronic file(s) of marked-up paper copy of Product Data.
 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.7 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file or scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.8 MAINTENANCE OF RECORD DOCUMENTS

- A. 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 Engineer/Architect's reference during normal working hours.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

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SECTION 02 00 10 - WORK ITEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Divisions **1 - 22** Specification Sections apply to this Section.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

WI 1.0 GENERAL REQUIREMENTS

- A. Scope of Work
 - 1. Work consists of performing all tasks, specifically required and incidental, which are not identified under separate Work Item designation, but necessary to perform the work identified in this project. This work includes, but is not limited to the following items:
 - WI 1.1 - Mobilization
 - WI 1.2 - Concrete Formwork
 - WI 1.4 - Concrete Reinforcement
 - WI 1.5 – Overhead Protection/Temporary Signage/Traffic Control

WI 1.1 PROJECT MOBILIZATION

- A. Scope of Work
 - 1. Work consists of coordinating, scheduling, obtaining, and assembling at construction site all equipment, materials, permits, supplies, manpower and other essentials and incidentals necessary to perform Work defined in this Contract. Payment of lump sum amount for mobilization shall be according to following schedule and shall be based on percentage of original contract amount earned.
- B. Materials
 - 1. None
- C. Execution
 - 1. At execution of agreement by all parties, mobilization payment shall not be more than 25% of mobilization lump sum amount.

2. When billing amount earned is greater than 10% but less than 25% of original contract amount, total payment for mobilization shall not be more than 50% of mobilization lump sum amount.
3. When billing amount earned is equal to or greater than 25% but less than 50% of original contract amount, total payment for mobilization shall not be more than 75% of mobilization lump sum amount.
4. When billing amount earned is equal to or greater than 50% of original contract amount, total payment for mobilization shall be 100% of mobilization lump sum amount.

WI 1.2 CONCRETE FORMWORK

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to install formwork as required for cast-in-place concrete.

B. Materials

1. Forms for Exposed Finish Concrete: Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on Drawings.
 - a. Use overlaid plywood complying with U.S. Product Standard PS-1 "A-C or B-B High Density Overlaid Concrete Form," Class I
 - b. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled, and edge-sealed, with each piece bearing legible inspection trademark.
2. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
3. Form Coatings: Provide commercial formulation form-coating compounds with a maximum VOC meeting local requirements that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces, including but not limited to water-curing, curing compound, stains, or paints.
4. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection and to prevent spalling concrete upon removal. Provide units that will leave no metal closer than 1.5 in. to exposed surface.
5. Shores:
 - a. Nail Ellis clamps, if used with wood shores, to shores with minimum of two nails to prevent slipping.
 - b. Wedges: Hardwood or steel. Softwood wedges prohibited.

C. Execution

1. Work shall conform to requirements of latest edition of ACI 301 "Standard Specifications for Structural Concrete," ACI 302.1 R "Guide for Concrete Floor Slab Construction," ACI 318 "Building Code Requirements for Reinforced Concrete," and ACI 347 "Recommended Practice for Concrete Formwork" except as modified by the following paragraphs.
2. Store all formwork and formwork materials clear of ground, protected, so as to preclude damage.
3. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
4. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
5. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
6. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
7. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
8. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing before concrete placement as required to prevent mortar leaks and maintain proper alignment.
9. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.
10. Coat contact surfaces of forms with accepted, nonresidual, low-VOC form-coating compound before reinforcement is placed.
11. Coat steel forms with non-staining, rust-preventive form oil or otherwise protect against rusting. Rust-stained steel formwork not acceptable.
12. For non-post-tensioned concrete, formwork shall remain in place until concrete has reached minimum two-thirds of 28-day strength. Do not place additional loads on structure until concrete has been properly reshored.
13. Clean and repair surfaces of forms to be re-used in Work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
14. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and

secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Engineer/Architect.

WI 1.4 CONCRETE REINFORCEMENT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to fabricate and install all mild steel reinforcement and epoxy coated reinforcement.

B. Materials

1. Reinforcement materials shall be as specified in ACI 301 "Standard Specifications for Structural Concrete."
2. Welded wire reinforcement: provide mats only. Roll stock prohibited.
3. Epoxy Coating Materials for Reinforcement: ASTM A775 and A884:
4. Supplier shall be certified currently under CRSI Fusion Bonded Epoxy Coating Applicator Plant Certification Program.
5. Provide one of following epoxy coatings for reinforcement and steel accessories as noted on the Drawings:
 - a. "Scotchkote 413," by 3M Company, St. Paul, MN.
 - b. "Nap-Gard 7-2719," by Axalta Coating Systems LLC.
6. Use patching material recommended by epoxy powder manufacturer, compatible with epoxy coating and inert in concrete. Acceptable materials are as follows:
 - a. "Scotchkote 413/215," by 3M Company, St. Paul, MN.
 - b. "MasterEmaco P124," by BASF Building Systems, Shakopee, MN.
 - c. "Duralprep AC," by The Euclid Chemical Company, Cleveland, OH.
 - d. "Sika Armatec 110 EpoCem," by Sika Corporation, Lyndhurst NJ.
7. Corrosion Inhibiting Coating for Existing Exposed Non-prestressed Steel Reinforcement or Welded wire reinforcement:
 - a. "MasterEmaco ADH 326," by BASF Building Systems, Shakopee, MN.
 - b. "Euco 452", or "Duralcrete Series" by The Euclid Chemical Company, Cleveland, OH.
 - c. "Sikadur 32 Hi-Mod LPL," by Sika Corporation, Lyndhurst, NJ.
 - d. "Sika Armatec 110 EpoCem," by Sika Corporation, Lyndhurst NJ.

C. Execution

1. Work shall conform to requirements of latest edition of ACI 301 "Standard Specifications for Structural Concrete," ACI 315 "Details and Detailing of Concrete Reinforcement," ACI 318 "Building Code Requirements for Reinforced Concrete," and Concrete Reinforcing Steel Institute (CRSI), "Manual of Standard Practice."
2. Submittals required include: Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching

compounds, joint systems, curing compounds, and others as requested by Engineer/Architect including, but not limited to:

- a. Manufacturer's product data and installation instructions for proprietary form coatings, manufactured form systems, ties, and accessories.
 - b. Steel producer's certificates of mill analysis, tensile tests, and bend tests.
 - c. Manufacturer's product data, specifications, and installation instructions for proprietary materials, welded and mechanical splices, and reinforcement accessories.
 - d. Corrosion Inhibitor for Reinforcement:
 - 1) Written certification from coating manufacturer that coating resin for reinforcement has been approved by National Bureau of Standards.
 - 2) Written information from coating manufacturer on proper use and application of coating resin.
 - 3) Coating applicator's written certification of results of quality control program.
 - e. Submit all materials and methods for concrete curing to Engineer/Architect for approval before beginning concreting Work. Include certification of curing compound allowable moisture loss.
3. Store concrete reinforcement materials at site to prevent damage and accumulation of dirt or excessive rust.
 4. Epoxy Coated Reinforcement:
 - a. Contact areas of handling and hoisting systems shall be padded or be made of nylon or other acceptable material.
 - b. Use spreader bars to lift bundles of coated steel to prevent bar-to-bar abrasion.
 - c. Pad bundling bands or fabricate of nylon or other acceptable material.
 - d. Store coated steel on padded or wooden cribbing.
 - e. Do not drag coated steel members.
 - f. After placement, restrict traffic on coated steel to prevent damage.
 5. Reinforcement with any of following defects will be rejected:
 - a. Lengths, depths, and bends exceeding CRSI fabrication tolerances.
 - b. Bends or kinks not indicated on Drawings or final Shop Drawings.
 - c. Reduced cross-section due to excessive rusting or other cause.
 6. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as herein specified.
 - a. Avoiding cutting or puncturing vapor retarder during reinforcement placement and concreting operations.
 - b. Examine conditions under which concrete reinforcement is to be placed, and immediately notify Engineer/Architect in writing of unsatisfactory conditions. Do not proceed with Work until unsatisfactory conditions have been corrected in acceptable manner.

- c. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
- d. Fabricate reinforcement to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI MSP. In case of fabricating errors, do not re-bend or straighten reinforcement in manner that will injure or weaken material.
- e. Bends in reinforcement are standard 90° bends unless noted otherwise.
- f. Reinforcement with any of following defects will be rejected:
 - 1) Lengths, depths, and bends exceeding CRSI fabrication tolerances.
 - 2) Bends or kinks not indicated on Drawings or final Shop Drawings.
 - 3) Reduced cross-section due to excessive rusting or other cause.
- g. Perform all welding of mild steel reinforcement, metal inserts and connections with low hydrogen welding electrodes in accordance with AWS D1.4.
- h. Epoxy coated reinforcement: Fabricator and applicator to provide installer with written instructions to handle, store and place epoxy coated reinforcement to prevent damage to coating.
- i. Comply with ACI 301, Chapter 3 for placing reinforcement.
- j. Use rebar chairs and accessories to hold all reinforcing positively in place. Provide rebar chairs at all formed surfaces, both vertical and horizontal, to maintain minimum specified cover. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Maximum spacing of chairs and accessories shall be per CRSI Manual of Standard Practice. In situations not covered by CRSI, provide support at 4 ft on center maximum each way.
- k. Install welded wire reinforcement in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- l. Splices:
 - 1) Provide standard reinforcement splices by lapping ends, placing bars in contact, and tying tightly with wire. Comply with requirements of ACI 318 for minimum lap of spliced bars.
 - 2) For mechanical tension splices of reinforcement:
 - a) Column bar lengths shall not exceed 30 ft between splices. In any bar, no splices shall occur at any floor level.
 - b) Exercise care to assure that no reduction of cross-sectional area of reinforcement occurs.
 - c) Use Barsplice Products, Inc., Bar-Grip or Grip-Twist, NMB Splice Sleeve, or Erico LENTON splices.
 - d) For all mechanical splices, perform splicing in strict accordance with manufacturer's requirements and instructions.
 - e) All splices to develop 125% of specified yield strength of bars, or of smaller bar in transition splices.
 - f) Stagger splices in adjacent bars.
 - g) Except where shown on Drawings, welding of reinforcement prohibited without prior written authorization by Engineer/Architect.

- 3) Compression splices: Mechanically coupled splices in accordance with ACI 318.

m. Epoxy Coated Reinforcement:

- 1) Rest epoxy coated steel members supported from formwork on coated wire bar supports, or on bar supports made of dielectric material or other suitable material.
- 2) Coat wire bar supports with dielectric material for minimum distance of 2 in. from point of contact with coated steel member.
- 3) Fasten epoxy-coated steel members with nylon-, epoxy-, or plastic-coated tie wire, or other suitable material acceptable to Engineer/Architect.
- 4) Mechanical connections, when required, shall be installed in accordance with splice device manufacturer's recommendations. Repair any damage to coating.
- 5) All parts of mechanical connections on epoxy-coated steel, including steel splice sleeves, bolts, and nuts shall be coated with same material used for repair of coating damage.
- 6) Do not cut epoxy-coated steel unless permitted by Engineer/ Architect. When cut, coat ends with material used for repair of coating damage.

WI 1.5 OVERHEAD PROTECTION/TEMPORARY SIGNAGE/TRAFFIC CONTROL

A. Scope of Work

1. This work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to: provide, erect, maintain and remove following completion of project overhead protection for vehicles and pedestrians, necessary to protect and control the project site for the duration of the project; and provide and install and remove following completion of project, temporary signage, traffic control barricades/fences, and all other traffic controls as required for vehicular and pedestrian traffic control and user information during construction and as required by Owner and Engineer/Architect.

B. Materials

1. Overhead protection shall be capable of handling all construction loads, and shall be a manufactured frame type with ceiling providing overhead protection. The overhead protection shall provide protection from falling materials typically encountered during repairs to the structure interior and exterior and be waterproofed. All exposed surfaces shall be maintained to the owner's satisfaction, including painting if specifically requested by Owner.
2. Temporary signage shall meet following minimum requirements:
 - a. Minimum size: 48" x 48"
 - b. Backing material: 0.5 in. medium density overlay plywood.
 - c. Colors:
 - 1) Background: medium orange or white.

- 2) Symbols/Lettering: black
- d. Lettering: silk screened or die-cut.
 - 1) Font Style: Helvetica or similar.
 - 2) Size: 2 in. high minimum for pedestrian information; 4 in. high minimum for traffic information.
3. Barricades/barriers shall at minimum 4 ft. 0 in. high solid temporary barrier constructed of wood or concrete to separate Work areas from areas open to public.

C. Execution

1. Contractor shall submit a detailed action plan to Owner and Engineer for overhead protection, temporary signage, and traffic control prior to mobilizing for general conformance and informational purposes only.
2. Erect overhead protection as required to make project site safe for public. Under no circumstances shall construction work be performed without site protection in place to safeguard public.
3. Temporary signage and appropriate barricades for traffic control shall be provided to the satisfaction of the Owner to adequately inform the public (pedestrians and vehicles) of construction operations and how they are to proceed in and around the building site.
4. Signage mounting height: 5 ft. to bottom of sign. Provide mounting brackets as required.
5. Contractor shall submit shop drawings detailing sign size, layout, colors, and mounting schemes for approval prior to fabricating signs and mounting brackets.
6. Typical regulatory signs (that is, STOP, YIELD, DO NOT ENTER, TWO-WAY TRAFFIC HEAD, NO PARKING, etc.) and "Handicap" signs shall conform to all Federal, state, and local requirements for sizes, materials, and colors.
7. After removal of overhead protection/temporary signage/traffic controls, clean areas affected by these elements to condition prior to installation.

WI 3.0 CONCRETE FLOOR REPAIR

A. Scope of Work

1. This Work consists of furnishing all labor, materials, equipment, supervision, and incidentals including all construction shoring necessary to locate existing spalls, locate and remove deteriorated (delaminated, spalled) and unsound floor concrete, prepare cavities, and install new concrete and reinforcing (as required) materials to restore concrete floor to original condition and appearance. Refer to Detail Series 3.0 for specific requirements.

B. Materials

1. Concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration".
2. Conventional steel reinforcement shall be as specified in Division 03 Section "Cast-in-Place Concrete - Restoration" and/or Work Item 1.4, "Concrete Reinforcement."

C. Execution

1. Locating, marking, removal, preparation, and inspection of deteriorated concrete and reinforcing steel preparation, repair and installation shall be performed as specified in Division 02 Section "Surface Preparation for Patching and Overlay."
2. Final surface preparation, concrete placement, finishing and curing shall be performed as specified in concrete repair material specification. Manufacturer specifications/requirements for these issues shall also be followed in the event proprietary bag mix repair materials are used.

WI 3.1 FLOOR REPAIR - PARTIAL DEPTH / SHALLOW AT CONSTRUCTION JOINT

- A. Refer to Work Item 3.0, "Concrete Floor Repair" for scope of Work, materials and Execution procedure associated with this Work Item. Refer to Detail 3.1 for specific requirements.

WI 3.3 FLOOR REPAIR - FULL DEPTH AT CONSTRUCTION JOINT

- A. Refer to Work Item 3.0, "Concrete Floor Repair" for Scope of Work, Material and Execution procedures associated with this Work Item. Refer to Detail 3.3 for specific requirements.

WI 3.4 FLOOR REPAIR – CURBS/WALKS

- A. Refer to Work Item 3.0, "Concrete Floor Repair" for Scope of Work, Material and Execution procedures associated with this Work Item. Refer to Detail 3.4 for specific requirements.

WI 3.6 FLOOR REPAIR - PARTIAL DEPTH TOPPING STRIP REMOVAL / REPLACEMENT

- A. Scope of Work
1. This Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate and remove existing unsound and sound concrete in designated repair strips, prepare resulting cavities and install new concrete material and reinforcement to construct to restore floor slab to original integrity and appearance. Refer to Detail 3.6 for specific requirements.
 2. Refer to Work Item 3.0, "Concrete Floor Repair" for Material and Execution procedures associated with this Work Item.

WI 3.7 FLOOR REPAIR – CONCRETE WASH

- A. Scope of Work
1. This Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate and remove existing unsound and sound concrete,

prepare resulting cavities, and install new concrete material and reinforcement to construct new concrete washes.

2. Refer to Work Item 3.0, "Concrete Floor Repair" for Material and Execution procedures associated with this Work Item.

WI 3.8 FLOOR REPAIR – SCALED CONCRETE SURFACE

A. Scope of Work

1. Refer to Work Item 3.0, "Concrete Floor Repair" for Scope of Work, Material and Execution procedures associated with this Work Item. Refer to Detail 3.8 for specific requirements.

WI 3.10 FLOOR REPAIR – STAIR NOSING REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment. Supervision and incidentals necessary to locate existing spalled or delaminated stair nosing, removal of embedded metal nosing, removal of deteriorated and unsound concrete, prepare cavities, and install patching material [and prefabricated non-slip tread/nosing] to restore stair to serviceable condition. Refer to Detail 3.10 for specific requirements.

B. Materials

1. Shallow/small placements: Trowel applied patching material shall be specified in Division 03 Section "Prepackaged Repair Mortar."
2. Deep/large placements: Concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration", and/or Division 03 Section "Prepackaged Repair Mortar",
3. Dowels shall be stainless steel, Type 304, threaded set in approved epoxy.
4. High modulus, high strength epoxy paste resin adhesive with either rapid set or extended working time. Acceptable materials for this Work are:
 - a. "MasterEmaco ADH 327," or "MasterEmaco ADH 327 RS", or "MasterEmaco ADH 1420," or by BASF Building Systems, Shakopee, MN.
 - b. "Dural Fast Set Epoxies", or "EUCO #452 Epoxy System", by The Euclid Chemical Company, Cleveland, OH.
 - c. "Sikadur 31, Hi-Mod Gel", "Sikadur 32 Hi Mod", "Sikadur Hi-Mod LPL", or "Sikadur 33", by Sika Corporation, Lyndhurst, NJ.
 - d. Other types may be used only with Engineer/Architect's approval in writing prior to bidding.

C. Execution

1. Locating, marking, removal, preparation, and inspection of deteriorated floor surface concrete and reinforcing steel preparation, repair and installation shall be

- performed as specified in Division 02 Section "Surface Preparation for Patching and Overlay."
2. Final surface preparation, concrete placement, finishing and curing shall be performed as specified in concrete repair material specification. Manufacturer specifications/requirements for these issues shall also be followed in the event proprietary bag mix repair materials are used.
 3. Install prefabricated non-slip tread/nosing as shown on the referenced Detail.

WI 3.11 FLOOR REPAIR – STAIR LANDING PARTIAL DEPTH

- A. Refer to Work Item 3.0, "Concrete Floor Repair" for scope of Work, materials and Execution procedure associated with this Work Item. Refer to Detail 3.11 for specific requirements.

WI 3.12 FLOOR REPAIR – REMOVE / REPLACE ADA CURB CUT

- A. Refer to Work Item 3.0, "Concrete Floor Repair" for Scope of Work, Material and Execution procedures associated with this Work Item. Refer to Detail 3.12 for specific requirements.

WI 4.0 CONCRETE CEILING REPAIR

- A. Scope of Work
 1. This Work consists of furnishing all labor, materials, equipment, supervision, and incidentals including shoring necessary to locate existing spalls, locate and remove delaminated and unsound overhead concrete, prepare cavities, and install new concrete and reinforcing (as required) materials to restore overhead concrete to original condition and appearance. Refer to Detail Series 4.0 for specific requirements.
- B. Materials
 1. Repair patching material shall be as specified in Division 03 Section "Prepackaged Repair Mortar." This material may be used for shallow removal and repair Work Items only.
- C. Execution
 1. Locating, marking, removal, preparation, and inspection of deteriorated concrete and reinforcing steel preparation, repair and installation shall be performed as specified in Division 02 Section "Surface Preparation for Patching and Overlay."
 2. Final surface preparation, concrete placement, finishing and curing shall be performed as specified in concrete repair material specification. Manufacturer specifications/requirements on these issues shall also be followed in the event proprietary bag mix repair materials are used.
 3. Contractor shall take care to protect adjacent areas from material spillage. Area adjacent to repair shall be cleaned to Owner's satisfaction prior to leaving site.

WI 4.1 CEILING REPAIR –PARTIAL DEPTH / SHALLOW

- A. Refer to Work Item 4.0, "Concrete Ceiling Repair" for Scope of Work, materials and procedure associated with this Work Item. Refer to Detail 4.1 for specific requirements.

WI 4.2 CEILING REPAIR –PARTIAL DEPTH / DEEP

- A. Refer to Work Item 4.0, "Concrete Ceiling Repair" for Scope of Work, materials and procedure associated with this Work Item. Refer to Detail 4.2 for specific requirements.

WI 6.0 CONCRETE COLUMN REPAIR

- A. Scope of Work
 - 1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals including all construction shoring, excavation of pavement and subgrade necessary to locate and remove delaminated and unsound concrete, prepare cavities, and install concrete and reinforcing (as required) materials to restore concrete in accordance to Detail Series 6.0 requirements.
- B. Materials
 - 1. Cast-in-place concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration", and/or Division 03 Section "Prepackaged Repair Mortar."
 - 2. Conventional steel reinforcement shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration" and/or Work Item 1.4, "Concrete Reinforcement."
 - 3. Paving material shall be as specified in Section Asphalt Paving.
- C. Execution
 - 1. Locating, marking, removal ,preparation, and inspection of deteriorated concrete and reinforcing steel preparation, repair and installation shall be performed as specified in Division 02 Section "Surface Preparation for Patching and Overlay." Install shoring at repair locations where required per the Construction Documents prior to starting removals. Submit engineered shoring plan from registered Shoring Engineer for Record Copy to Engineer. Shoring plan to be stamped by Shoring Engineer.
 - 2. Final surface preparation, concrete placement, finishing and curing shall be performed as specified in concrete repair material specification. Manufacturer specifications/requirements on these issues shall also be followed in the event proprietary bag mix repair materials are used.

WI 6.6 COLUMN REPAIR – PIER BASE

- A. Refer to Work Item 6.0, "Concrete Column Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 6.6 for specific requirements.

WI 6.7 COLUMN REPAIR – PILASTER ENCASEMENT

- A. Refer to Work Item 6.0, "Concrete Column Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 6.7 for specific requirements.

WI 7.0 CONCRETE WALL REPAIR

- A. Scope of Work
 - 1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals including shoring necessary to locate existing spalls, locate and remove delaminated and unsound concrete, prepare cavities, and install concrete and reinforcing (as required) materials to restore concrete walls to original condition and appearance. Refer to Detail Series 7.0 for specific requirements.
- B. Materials
 - 1. Cast-in-place concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration", and/or Division 03 Section "Prepackaged Repair Mortar",
 - 2. Conventional steel reinforcement shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration" and/or Work Item 1.4, "Concrete Reinforcement."
 - 3. Trowel applied patching material shall be as specified in Division 03 Section "Prepackaged Repair Mortar." Trowel application of material may only be used for shallow removal and repair Work Items only.
- C. Execution
 - 1. Locating, marking, removal ,preparation, and inspection of deteriorated concrete and reinforcing steel preparation, repair and installation shall be performed as specified in Division 02 Section "Surface Preparation for Patching and Overlay ." Install shoring at repair locations where required per the Construction Documents prior to starting removals.
 - 2. Final surface preparation, concrete placement, finishing and curing shall be performed as specified in concrete repair material specification. Manufacturer specifications/requirements on these issues shall also be followed in the event proprietary bag mix repair materials are used.
 - 3. Contractor shall take care to protect adjacent areas from material spillage. Area adjacent to repair shall be cleaned to Owner's satisfaction prior to leaving site.

WI 7.1 WALL REPAIR - PARTIAL DEPTH / SHALLOW

- A. Refer to Work Item 7.0, "Concrete Wall Repair" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 7.1 for specific requirements.

WI 9.0 EXPANSION JOINT PREPARATION

WI 9.2 EXPANSION JOINT PREPARATION –BLOCKOUT REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate Work area, remove sound and unsound floor slab concrete as required, prepare cavity surface, and install concrete wash with expansion joint blockout. Refer to Detail 9.2 for specific requirements. This Work shall be coordinated with Work Item 10.0, "Expansion Joint Repair and Replacement."

B. Material

1. Cast-in-place concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration", and/or Division 03 Section "Prepackaged Repair Mortar".

C. Execution

1. Contractor shall remove existing expansion joint materials in manner that minimizes damage to adjacent concrete.
2. Alterations and preparation to existing expansion joint concrete blockout and adjacent slab required for installation of new concrete wash with blockout and expansion joint system shall be performed in accordance with this Work Item and Division 02 Section "Surface Preparation for Patching and Overlay."
3. Contractor shall locate and mark wash installation areas as located on Drawings.
4. All sound and unsound concrete shall be removed from within marked boundaries by saw cutting and chipping to sufficient width and depth as described in Detail 9.2. Caution shall be exercised during saw cutting operations to avoid damaging existing reinforcement near surface of concrete.
5. Spalls and delaminations located within blockout shall be patched in accordance with Work Item 3.0, "Concrete Floor Repair."
6. Final surface preparation, concrete placement, finishing and curing shall be performed as specified in concrete repair material specification. Manufacturer specifications/requirements for these issues shall also be followed in the event proprietary bag mix repair materials are used.

WI 10.0 EXPANSION JOINT REPLACEMENT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to remove existing expansion joints, prepare adjacent concrete and furnish and install new expansion joint system. Refer to Detail Series 10.0 for specific requirements.

B. Materials

1. Expansion joint system materials shall be as specified in Division 07 Section "Expansion Joint Assemblies," installed in strict accordance with manufacturer's recommendations.
2. Cast-in-place concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration", and/or Division 03 Section "Prepackaged Repair Mortar".
3. Trowel applied patching material shall be as specified in Division 03 Section "Prepackaged Repair Mortar." Trowel application may only be used for shallow removal and repair Work Items only.

C. Execution

1. Contractor shall locate and mark all expansion joint installation areas requiring replacement as located on Drawings. Contractor shall remove existing expansion joint materials in manner that minimizes damage to adjacent concrete. Contractor shall notify Engineer when seal is removed for review and authorization to replace existing blockout.
2. Alterations to existing expansion joint blockout required for installation of new expansion joint system shall be performed in accordance with Work Item Series 9.0, "Expansion Joint Preparation."
3. Joint installation procedures shall be in accordance with referenced specifications and manufacturer's recommendations.
4. In-place testing: Prior to opening to traffic, test joint seal for leaks with 2 in. water depth maintained continuously for 12 hrs. Repair leaks revealed by examination of seal underside. Repeat test and repairs until all leaks stopped for full 12 hrs.

WI 10.3 EXPANSION JOINT – ELASTOMERIC CONCRETE EDGED

- A. Refer to Work Item 10.0, "Expansion Joint Repair and Replacement" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 10.3 for specific requirements.

WI 10.5 EXPANSION JOINT - ADHERED

- A. Refer to Work Item 10.0, "Expansion Joint Repair and Replacement" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 10.5 for specific requirements.

WI 11.0 CRACK AND JOINT REPAIR

WI 11.1 REPLACE/REPLACE CONTROL JOINT SEALANT 1/2" WIDE

- A. Scope of Work
1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate existing control joint sealant in floor joints, remove

existing sealant, prepare edges, install primer and backer rod, and install new joint sealant. Refer to Detail 11.1 for specific requirements.

B. Materials

1. Approved materials for use in this Work are specified in Division 07 Section "Concrete Joint Sealants."

C. Execution

1. Contractor shall locate joint and remove all existing sealant materials in the floor joints on each level.
2. When existing joint dimensions do not conform to Detail 11.1, joints shall be routed or sawcut to an adequate width and depth to match Work Item Detail. Routing shall be performed by mechanized device that has positive mechanical control over depth and alignment of cut.
3. Cavities shall be thoroughly cleaned by either **sandblasting or grinding** to remove all remaining sealant and unsound concrete which may interfere with adhesion. Groove shall also be air blasted to remove remaining debris.
4. Sealant materials and installation procedures shall be in accordance with referenced specifications for selected material.
5. Traffic topping manufacturer shall verify in writing that joint sealant is compatible with traffic topping.

WI 11.2 REPLACE/INSTALL CRACK/JOINT SEALANT

B. Scope of Work

6. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate and mark failed joint sealant, remove existing sealant, prepare edges, and reseal joints and cracks. Refer to Detail 11.2 for specific requirements.

D. Materials

1. Approved materials for use in this Work are specified in Division 07 Section "Concrete Joint Sealants."

E. Execution

1. Contractor shall locate existing crack and joint sealant for replacement.
2. Contractor shall remove existing sealant from joints and/or cracks.
3. When existing joint dimensions do not conform to Detail 11.2, joints shall be routed or sawcut to an adequate width and depth to match Work Item Detail. Routing shall be performed by mechanized device that has positive mechanical control over depth and alignment of cut.
4. Cavities shall be thoroughly cleaned by either sandblasting or grinding to remove all remaining sealant and unsound concrete which may interfere with adhesion. Groove shall also be air blasted to remove remaining debris.

5. Sealant materials and installation procedures shall be in accordance with referenced specifications for selected material.
6. Traffic topping manufacturer shall verify in writing that joint sealant is compatible with traffic topping.
7. Crack and joint sealant work shall be incidental to traffic topping system.

WI 11.4 TOOL AND SEAL PATCH PERIMETER AND CONTROL JOINTS

A. Scope of Work

1. Work consists of providing all labor, materials, equipment, supervision, and incidentals necessary to provide tooled and sealed control joints in concrete as shown on Drawings. Refer to Detail 11.4 for specific requirements. Refer to detail 3.0 series for further information.

B. Materials

1. Sealant materials shall be as specified in Division 07 Section "Concrete Joint Sealants."

C. Execution

1. Contractor shall locate and provide control joints at all column grid lines and at all existing control and construction joints, and at any additional locations shown in the Construction Documents.
2. Control joints shall be tooled and formed in plastic concrete. Sawcutting joints after concrete sets will not be allowed.
3. Tooled joints shall be of proper dimension in plastic concrete.
4. Sealant materials and installation procedures shall be in accordance with referenced specifications for selected material.

WI 11.5 REMOVE /REPLACE CONTROL JOINT SEALANT 1 1/2" WIDE

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidentals necessary to locate 1 1/2" wide floor joints on each level, remove existing sealant and backer rod, prepare and prime joints, install backer rod, and install new control joint sealant as shown on the drawings. Refer to Detail 11.5 for specific requirements.

B. Materials

1. Approved materials for use in this Work are specified in Division 07 Section "Concrete Joint Sealants."

C. Execution

1. Control joints shall have all existing sealant materials removed and joint edges cleaned and ground for installation of sealant. Exposed flange connections shall

- be examined for damaged or broken welds. Broken welds shall be repaired per work item
2. Cavities shall be thoroughly cleaned by either sandblasting or grinding to remove all laitance, unsound concrete and curing compounds which may interfere with adhesion. Groove shall be air blasted to remove remaining debris.
 3. Sealant materials and installation procedures shall be in accordance with referenced specifications for selected material.
 4. Traffic topping manufacturer shall verify in writing that joint sealant is compatible with traffic topping. Crack and joint sealant work shall be incidental to traffic topping system.

WI 11.7 COVE SEALANT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to prepare concrete surfaces and install cove sealant between floor and vertical surfaces as shown on Drawings. Refer to Detail 11.7 for specific requirements.

B. Materials

1. Joint sealant materials shall be as specified in Division 07 Section Concrete Joint Sealants."

C. Execution

1. Intersection to be sealed shall be thoroughly cleaned by sandblasting to remove all contaminants and foreign material.
2. Entire Work area shall then be cleaned with compressed air to assure that all loose particles have been removed and that intersection is dry.
3. Properly prepared intersection shall be coated evenly and completely with joint primer material on each of intersecting faces in accordance with sealant manufacturer's recommendations.
4. After primer has cured, apply cove sealant to intersection such that sealant extends 0.75 in. onto each of intersecting faces.
5. Work cove sealant into joint so that all air is removed and tool to concave shape such that minimum throat dimension of no less than 0.5 in. is maintained.
6. Remove excess sealant and allow to cure.

WI 15.0 PROTECTIVE SEALER

A. Scope of Work

1. Work consists of providing all labor, materials, equipment, supervision, and incidentals necessary to prepare surfaces and install protective sealer system on concrete surfaces where shown on the drawing. Sealer application to be applied to the precast floor planks as shown on the drawings.

B. Materials

1. Protective sealer system materials shall be as specified in Division 07 Section "Water Repellents."

C. Execution

1. All floor surfaces scheduled to receive protective sealer system shall be identified by Contractor and verified with the Engineer.
2. All floor surfaces shall be prepared by shotblast in accordance with referenced specification section.
3. All other surfaces to be treated shall be mechanically brushed, waterblasted, or sandblasted as required and then airblasted prior to application. Use of waterblasting on vertical or overhead surfaces requires adequate drying time before application to achieve proper penetration. Check moisture content with moisture meter and ensure moisture content is below maximum allowable by material manufacturer.
4. Sealer application shall be as specified in referenced specification section. Overhead and vertical surface application shall be by brush or pressure sprayer.

WI 15.1 CONCRETE SEALER - FLOORS

- A. Refer to Work Item 15.0, "Protective Sealer" for scope of Work, materials and procedure associated with this Work Item.

WI 16.0 TRAFFIC TOPPING

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals, including installation of joint sealant materials, necessary to prepare existing floor surfaces and install traffic topping on floor and raised walk surfaces. Coating of all vertical surfaces within Work limits shall be incidental to installation of traffic topping. Refer to Detail series 16.0 for specific requirements.

B. Materials

1. Traffic topping materials shall be as specified in Division 07 Section "Traffic Coatings."
2. Aggregate materials used in the coating shall be flint type aggregate for all drive lanes and turning bays as approved by the manufacture. Aggregate materials used in the coating shall be silica sand type aggregate for all parking stall areas as approved by the manufacture.

C. Execution

1. Floor surface preparation shall be performed by coating system licensed applicator or under its direct supervision.

2. Shotblast surface preparation is required for all floor surfaces being traffic topped..
3. Coating system shall be installed by licensed applicators in strict accordance with manufacturer's recommendations and referenced specification section.
4. Crack preparation, including installation of sealant material where required, is to be completed in accordance with the work item details and shall be fully cured and compatible with the manufactured traffic coating material.
5. Coating system shall be thoroughly cured prior to Work areas being returned to service.

WI 16.1 TRAFFIC TOPPING - VEHICULAR

- A. Refer to Work Item 16.0, "Traffic Topping" for Scope of Work, materials and procedure associated with this Work Item. Refer to Detail 16.1 for specific requirements.

WI 16.3 TRAFFIC TOPPING – PEDESTRIAN AREAS (STAIRTOWERS 1, 2, 3)

- A. Scope of Work
 1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals, including installation of joint sealant materials, necessary to prepare existing stairtower landings floor surfaces and install medium duty traffic topping on concrete surfaces. Coating of all vertical surfaces within Work limits shall be incidental to installation of traffic topping. Refer to Detail series 16.0 for specific requirements.
- B. Materials Refer to Work Item 16.0, "Traffic Topping" for materials and procedure associated with this Work Item.

WI 16.4 TRAFFIC TOPPING – RECOAT STAIRTOWER LANDINGS STAIR #4

- A. Scope of Work
 1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals, including preparation of existing traffic coated surfaces and installation of crack, joint and cove sealant materials, necessary to recoat the existing traffic topping as shown on Drawings.
- B. Materials
 1. Traffic topping materials shall be as specified in Division 07 Section "Traffic Coatings" and shall be compatible with existing system. Obtain written approval from traffic topping manufacturer that existing coating surface is acceptable for installing new coating before beginning Work.
- C. Execution
 1. Removal of loose/failed existing coating, preparation of exposed concrete surfaces and existing traffic topping membrane shall be in strict accordance with

manufacturer's recommendations and referenced specification section. Floor surface preparation shall be performed by coating system licensed applicator or under its direct supervision.

2. Coating system shall be installed by licensed applicators in strict accordance with manufacturer's recommendations and referenced specification section.
3. Crack preparation, including installation of sealant material where required, is incidental to traffic topping work.
4. Preparation and installation of crack, joint, and cove sealant material, where required, is incidental to this Work Item.
5. Prior to recoating the area, any patches and/or bare concrete areas shall be coated with a base coat and an appropriate number of intermediate coats to bring the new membrane up to the level of the existing membrane. After this has been completed, the entire area will be recoated.
6. Existing prepared traffic topping membrane shall be fully cleaned in strict accordance with the manufacturer's requirements and recoated with a minimum of one intermediate coat with aggregate and one top coat.
7. Coating system shall be thoroughly cured and traffic marking completed prior to returning work areas to service.

WI 25.0 MECHANICAL - DRAINAGE

WI 25.1 MECHANICAL – ALLOWANCE

A. Scope of Work

1. Mechanical allowance shall be all related utility work (drain lines, sprinkler lines, electrical conduit, junction boxes, etc.) associated with potential interruptions of and temporary relocation of these utilities to facilitate repair to existing structural areas.
2. All utilities removed during Work shall be reinstalled in accordance with latest edition of electrical and mechanical codes in effect. Work ineligible for allowance includes Work covered by or incidental to Work Items within this Specification or for Work required through Contractor's negligence.

B. Method of Payment

1. Mechanical work as approved in writing by Engineer/Architect prior to implementation, shall be paid for by Contractor. Contractor shall provide written documentation of costs for work performed, including invoices from subcontractors with any General Contractor's markup, to Engineer/Architect with each pay request. Contractor shall attach documentation and invoices to written authorization. At completion of project, any variation between allowance and actual cost documentation will be reflected in an adjustment of allowance amount.

WI 25.2 MECHANICAL – SUPPLEMENTAL / REPLACEMENT FLOOR DRAINS

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to install new supplemental drains where shown on the drawings and approved by Engineer, and to remove and replace existing deteriorated floor drains with new galvanized floor drain assemblies where shown on the drawings. Work Item 25.3, "Mechanical - Pipe and Hangers" is directly related to this Work Item. Refer to Detail 25.2 for specific requirements.

B. Materials

1. Approved materials for this Work are as shown on Detail 25.2 and in Division 22 Section "Common Work Results for Plumbing" and Division 22 Section "Facility Storm Drainage Piping" and as identified in Detail WI 25.2. All floor drains shall be hot dipped galvanized drains with sediment buckets.
2. Concrete repair materials shall be as specified in Section "Prepackaged Repair Mortar".
3. Reinforcing materials shall be as specified in work item WI 1.5 Concrete Reinforcement.
4. Sealant materials shall be as specified in Division 07 Section "Concrete Joint Sealants."

C. Execution

1. Contractor shall Contractor shall verify low points on slab by ponding or elevation survey prior to locating new added drains and mark areas where significant floor ponding occurs by water flooding the floor area with water to determine low point and gravity flow of surface drainage. The added supplemental drains shall be installed where approved by the engineer. Contractor shall scan floor for reinforcement, remove concrete per detail 25.2, install new galvanized supplemental floor drain and replace concrete to match grade and finish of existing floor slab.
2. For prestressed concrete construction and in areas noted by Engineer/Architect, set drain location and core drain opening only after non-destructive testing verification of clear site.
3. Contractor shall also locate all existing floor drains designated for replacement. Existing drains shall be removed and floor area prepared for replacement with new galvanized drain assemblies.
4. Concrete work related to new supplemental and replacement drains shall be included and installed as shown and as part of detail 25.2..

WI 25.3 MECHANICAL - PIPE AND HANGERS 4" LINE

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to install new floor drain lines and replace existing corroded and cracked drain lines with new pipe and hangers. Work Item 25.2, "Mechanical - Supplementary Floor Drain" is directly related to this Work Item. Refer to Detail 25.3 for specific requirements.

B. Materials

1. Approved materials for this Work are as shown on Detail 25.3 and in Division 22 Section "Common Work Results for Plumbing" and Division 22 Section "Facility Storm Drainage Piping."

C. Execution

1. Branch lines for existing replacement and for new installation and connection of new supplementary drains are shown at the approximate location near the existing risers. The original structure (painted steel framing) will have all of the lines above grade replaced along with the floor drains as shown for each contract year. The garage expansion area (precast floor plank set on galvanized framing) will have selective drain line replacement of branch lines based upon their condition where located on the drawings. All line replacement work shall be tied or connected back to the existing drain risers.
2. Contractor shall locate and paint mark all existing drain line locations identified on the drawings for replacement, and identify lengths for each replacement location on the drawings and submit them to engineer for verification and approval prior to replacement work.
3. Contractor shall locate and paint mark all areas where added supplemental floor drain piping is required to support new supplementary added drains that are to be installed per WI 25.2.
4. Pipes and hangers shall be installed with adequate positive drainage slope at all locations along pipe runs.
5. Hangers and hardware shall be galvanized and installed as shown on Detail 25.3 and in accordance with referenced specification section.

WI 25.4 MECHANICAL – PIPE & HANGERS 6" LINE

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to replace existing corroded and cracked drain line risers with new pipe and hangers. Work Item 25.2, "Mechanical - Supplementary Floor Drain" is directly related to this Work Item. Refer to Detail 25.3 for specific requirements.

B. Materials

1. Approved materials for this Work are as shown on Detail 25.3 and in Division 22 Section "Common Work Results for Plumbing" and Division 22 Section "Facility Storm Drainage Piping."

C. Execution

1. Riser lines replacement included all branch, wye, elbow, or other fittings shall be included as part of the line replacement where shown at each location on the drawing. The original structure (painted steel framing) will have all of risers down to grade level replaced as shown for each contract year. The garage expansion

area (precast floor plank set on galvanized framing) will have selective drain riser pipe replacement based upon corroded condition where located on the drawings. All riser line replacement work shall be tied or connected back into existing risers as shown for replacement per contract year.

2. Contractor shall locate and paint mark all riser line locations identified on the drawings for replacement, and identify lengths for each replacement location on the drawings and submit them to engineer for verification and approval prior to replacement work.
3. Pipe clamps, hangers, supports and fittings, shall be installed plumb with all branch lines reconnected with adequate positive drainage slope.
4. Hangers and hardware shall be galvanized and installed as shown on Detail 25.3 and in accordance with referenced specification section.

WI 25.5 MECHANICAL – PIPE & HANGERS 8” LINE

- A. Refer to Work Item 25.4, "Mechanical – Supplementary Floor Drain" for Scope of Work, materials and procedure associated with this Work Item. Refer to Detail 25.3 for specific requirements.

WI 26.0 MECHANICAL – FIRE PROTECTION

WI 26.2 MECHANICAL – STANDPIPE REPLACEMENT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to access the existing standpipe from level 1, remove the section of existing standpipe where shown on the drawing, install new galvanized steel line and reconnect new line to the existing lines and riser system. Work shall include system inspection and hydrostatic pressure testing of the line in compliance and coordination with the Portsmouth, NH Fire Department.

B. Materials

1. Approved materials for this Work are as specified in Division 21 Section Fire Suppression Standpipes and Section Common Work Results for Fire Suppression.

C. Execution

1. Contractor shall locate and paint mark line replacement limits as shown on the drawing. Limits shall be verified by Contractor with Engineer.
2. Contractor shall notify the City of Portsmouth, NH Fire Department and obtain all permits that may be required to facilitate this work, inspections, and testing.
3. Contractor shall cut into and remove existing standpipe line identified to be replaced. New line to be connected by welding or connected by pipe couplings

- and suspended from the steel framing or slab with all new galvanized hardware and fittings (hangers, rods, clevis, etc.) to be installed by contractor.
4. Pipes and hangers shall be installed with adequate directional slope on the line for drainage. All work shall be performed in compliance to current code in effect and PFD requirements.
 5. The contractor shall have the line hydrostatically tested for 200 psi and witnessed by the Portsmouth Fire Department. Contractor shall notify the Fire Department when testing is completed for acceptance by the City.

WI 30.0 ELECTRICAL

WI 30.1 ELECTRICAL ALLOWANCE

A. Scope of Work

1. Electrical allowance shall be all related utility work (electrical conduit, junction boxes, light fixtures, etc.) associated with temporary interruptions or relocation of these utilities to repair existing structural areas.
2. All utilities removed during Work shall be reinstalled in accordance with latest edition of electrical and mechanical codes in effect. Work ineligible for allowance includes Work covered by or incidental to Work Items within this Specification or for Work required through Contractor's negligence.

B. Method of Payment

1. Electrical work as approved in writing by Engineer/Architect prior to implementation, shall be paid for by Contractor. Contractor shall provide written documentation of costs for work performed, including invoices from subcontractors with any General Contractor's markup, to Engineer/Architect with each pay request. Contractor shall attach documentation and invoices to written authorization. At completion of project, any variation between allowance and actual cost documentation will be reflected in an adjustment of allowance amount.

WI 37.0 DOORS, FRAMES AND HARDWARE

WI 37.1 DOOR AND FRAME REPLACEMENT

A. Scope of Work

1. Work Consists of labor, materials, equipment, supervision, and incidentals to remove the existing door and frame assembly and replace with a new door assembly with framing, closures, weather seals, and hardware. Refer to drawings for additional requirements and location of work under this item.

B. Materials

1. Materials as specified in Section "Hollow Metal Door & Frames" & Section "Door Hardware".
2. Sealant materials shall be as specified in Section "Concrete Joint Sealants".
3. Painting materials shall be as specified in Section "Exterior Painting".
4. Grout fill materials shall be as specified in Section "Prepackaged Repair Mortar".

C. Execution

1. Contractor shall locate measure and mark work location prior to start of work and verify rough opening dimensions, door swings, and threshold requirements.
2. Contractor shall prepare the masonry wall opening shown on the drawing and to receive a new door assembly. Contractor shall verify all field dimensions prior to developing submission for engineer's approval.
3. Doors shall be delivered with factory primed finish.
4. A cove sealant bead shall be installed around the doorframe on both sides prior to grout fill installation.
5. Following framing installation and door alignment, contractor shall grout fill door jambs.
6. Contractor shall install all required door hardware to match existing set-up including but not limited to thresholds, closers, panic bar, lever handles, weather stripping, kick plates, door stops, etc.
7. Contractor shall install door shoe and kick plate.
8. Doors shall be primed and top coat painted as part of the installation prior to final acceptance.
9. Contractor shall coordinate with the Owners door service for acquiring and installing a new electronic door latch and access card reader. Contractor shall provide and install the electronic hardware and coordinate the installation process with the Owners service provider.

WI 40.0 CONNECTIONS/BEARINGS

WI 40.3 RE-WELD SHEAR CONNECTOR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, shoring and jacking, supervision, and incidentals necessary to re-weld existing precast floor plank to plank connectors as indicated on the Drawings.

B. Materials

1. Welds shall be made using stainless electrodes.
2. If not stainless or galvanized, corrosion inhibiting coating shall be applied to exposed surfaces of connector with the following:
 - a. "Sikadur 32 Hi-Mod," by Sika Corporation, Lyndhurst, NJ.
 - b. "MasterEmaco ADH 326," by BASF Building Systems, Shakopee, MN.
 - c. "Armatec 110," Sika Corporation, Lyndhurst NJ.

- d. "Euco 452," The Euclid Chemical Company, Cleveland, OH.

C. Execution

1. Contractor shall locate and mark broken flange connectors exposed sealant removal during sealant replacement work.
2. Contractor shall verify locations with Engineer/Architect prior to starting Work.
3. Contractor shall clean connector to bare metal prior to welding.
4. Following welding, Contractor shall apply corrosion inhibitor coating on exposed connector steel in accordance with Division 02 Section "Surface Preparation for Patching and Overlay."

WI 41.0 STEEL STAIRS

WI 41.1 REPLACE STAIR RISER/PAN/FILL

A. Scope of Work

1. Work Consists of labor, materials, equipment, supervision, staging, and incidentals required to remove and dispose of the existing steel stair step pans, and any misc. items inside the designated stairtowers and floor levels, prepare the steel framing (stringers) of new metal step/riser units where designated replacement is shown. The Contractor shall include the closure of the stairtower during the required repair work. .

B. Materials

1. Stairs shall be as specified in Section "Metal Fabrications" and Section "Metal Pan Stairs".
2. Steel stair steps, and landing framing system shall be painted per Work Item 45.2.
3. Cast-in-place concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration" and/or Division 03 Section "Prepackaged Repair Mortar."
4. Conventional steel reinforcement shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration" and/or Work Item 1.4, "Concrete Reinforcement."

C. Execution

1. An option to the replacement of the stair steps and risers to precast stair steps and risers may be provided based upon a performance design by the manufacturer based on all verified dimensions and quantities collected by the contractor in the field. Precast stair step and riser option shall match the existing precast step and riser present in the stairtower.
2. All details for new stair system MUST be submitted to engineer for review before installation can take place.
3. Fabricate and install stairs as shown or as detailed on drawings. Contractor shall coordinate all work with other subcontractors.
4. Stair painting shall be accomplished following all installation work. Painting work shall be incidental to work item.

5. Stair step replacement shall match existing step rise over run.
6. Contractor shall apply a broom textured finish to the cast concrete fill on the steps subject to the approval of the Engineer. Proper uniform tolerances for cast concrete fill shall maintained and in accordance with the detail.

WI 41.2 STAIR LANDING REPLACEMENT

A. Scope of Work

7. Work Consists of labor, materials, equipment, supervision, staging, shoring, and incidentals required to remove and dispose of the existing concrete slab on steel deck, clean framing, install new corrugated metal deck, and install new concrete fill inside the designated stairtowers and floor levels where designated replacement is shown. The Contractor shall include the closure of the stairtower during the required repair work. .

B. Materials

1. Steel decking shall be as specified in Section "Metal Fabrications" and Section "Steel Decking".
8. Cast-in-place concrete repair materials shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration" and/or Division 03 Section "Prepackaged Repair Mortar."
9. Conventional steel reinforcement shall be as specified in Division 03 Section "Cast-in-Place Concrete Restoration" and/or Work Item 1.4, "Concrete Reinforcement."

C. Execution

10. All details for new landings shall be submitted to engineer for review before installation can take place.
11. Fabricate and install replacement landings as shown or as detailed on drawings. Contractor shall coordinate all work with other subcontractors.
12. Painting of the framing shall be accomplished following all installation work. Painting work shall be incidental to work item.
13. Landing replacement shall match existing floor grades at the door threshold and at the steps..
14. Contractor shall apply a uniform broom textured finish to the cast concrete fill with proper grade and finish free of ridges, depressions, and laitance suitable for application of traffic coating. Proper uniform tolerances for cast concrete fill shall maintained and in accordance with detail.

WI 43.0 MISCELLANEOUS METALS

WI 43.1 INSTALL STEEL CLOSURE PLATE AT FLOOR PERIMETER

A. Scope of Work

1. Work Consists of labor, materials, equipment, supervision, and incidentals required to access the locations shown on the drawing for installation of closure plate to close the gap between the wall and slab edge, fabricate and install new galvanized metal plate, and install sealant as shown on detail 43.1. Contractor shall secure all floor areas on and below the work to prevent damage to vehicles during the installation.

B. Materials

1. Material shall be as specified in Section "Metal Fabrications" or as shown on detail.
2. Sealant material shall be as specified in Division 07 Section Architectural Joint Sealants."

C. Execution

1. Contractor shall fabricate and install the metal closure plate to conform to the field dimensions and per the detail 43.1.

WI 43.3 INSTALL CHAIN LINK FENCE AT VEHICLE BARRIER STRAND

A. Scope of Work

1. Work Consists of labor, materials, equipment, supervision, and incidentals required to access the locations shown on the drawing for installation of new fencing to be installed along the existing barrier cable strand locations on the interior of the garage and where shown on the exterior (north elevation). Fabricate and install new d posts and framing and install new vinyl coated fence per detail 43.3. Contractor shall secure all floor areas on and below the work to prevent damage to vehicles during the installation.

B. Materials

2. Material shall be as specified in Division 32 Section "Chain Link Fence and Gates" or as shown on detail.

C. Execution

3. Contractor shall fabricate and install the fencing system to conform to the field dimensions and per the detail 43.3.

WI 45.0 PAINTING

WI 45.1 PAINT TRAFFIC MARKINGS

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate, layout and paint parking stall stripes, traffic

arrows, crosswalks, accessible stall access aisles, curbs, symbols, stop bars, crosswalks and all other required pavement markings as shown on the striping drawings. Refer to drawings RG-101 through RG-105 for further information and details on striping layout.

B. Materials

1. Painting materials shall be as specified in Division 09 Section "Pavement Marking."

C. Execution

1. Unless otherwise indicated in the Construction Documents, paint color shall match existing and be provided at same locations as shown on the striping drawings.
2. Contractor shall apply traffic markings following curing of the traffic topping application. Contractor shall apply striping prior to floor sealer application where indicated on the drawings.
3. Engineer/Architect may inspect all layout and surface preparation for conditions in accordance with Division 09 Section "Pavement Marking."

WI 45.2 PAINT STEEL FRAMING IN STAIRTOWER

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate, layout and paint existing steel framing and railings where designated inside the stairtowers as indicated on the drawings

B. Materials

1. Paint materials shall be as specified in Division 09 Section "Exterior Painting."

C. Execution

1. Contractor shall match the existing color or provide color as selected by the Owner.
2. Contractor shall provide required closure of the stairtower during the painting process. Areas that do not receive paint application shall be protected from overspray or drips.
3. Contractor shall insure proper paint thickness is applied and repair all defects (holidays, runs, pin holes) that may occur to application.
4. Contractor shall locate and layout Work areas as indicated on Drawings.
5. Contractor shall prepare surface to be painted in accordance with Division 09 Section "Exterior Painting" and manufacturer's recommendations.

WI 45.3 CLEAN AND PAINT STRUCTURAL STEEL

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, enclosures, and incidentals necessary to contain, with full height barriers, to allow preparatory cleaning by abrasive blasting, washing, and grinding, contain environment during painting operations, prepare, prime, and paint all exposed and accessible surfaces of structural steel framing, bracing, attachments, (façade connection, etc.) where indicated on the Drawings.
2. Work under this item shall also include moisture testing of substrates, surface preparation of substrates as required for acceptance of paint, including cleaning and making good all surfaces and areas to the limits defined and specific pre-treatments as specified for sealing / priming surfaces and for repainting in accordance with MPI Repainting Manual. Contractor to provide adequate ventilation and filtration as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.

B. Materials

1. Paint materials shall be as specified in Division 09 Section "High Performance Coatings."

C. Execution

1. This Contractor shall have a minimum of five (5) years proven satisfactory experience and shall show proof before commencement of work that he will maintain a qualified crew of painters throughout the duration of the work. When requested, Contractor shall provide a list of the last three comparable interior repainting jobs including, name, location, specifying authority / project manager, start / completion dates, and value of the work.
2. Only qualified journeypersons, as defined by local jurisdiction, shall be engaged in exterior repainting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyperson in accordance with trade regulations.
3. All surfaces requiring repainting shall be inspected by the Painting Subcontractor who shall notify the Consultant, Paint Inspection Agency, and General Contractor in writing of any defects or problems, prior to commencing repainting or after preparation work
4. All materials, preparation and workmanship shall conform to the standards contained in the latest edition of the Master Painters Institute (MPI) Maintenance and Repainting Manual (herein referred to as the MPI Repainting Manual).
5. Contractor shall locate and verify with Engineer/Architect all Work areas.
6. Contractor shall verify color selection with Owner prior to start of Work.
7. Contractor shall take all necessary measures to contain, with full height barriers, sandblasting debris and paint to immediate Work area to protect public from injury and property from damage.
8. Contractor shall solvent clean any surface area with oil or grease build-up prior to receiving additional preparation in accordance with SSPC-SP1 and Division 09 Section "High Performance Coatings".
9. Contractor shall prepare all areas with surface corrosion in accordance with Division 09 Section "High Performance Coating."
10. Contractor shall remove all debris from Work area prior to application of primer or paint.

11. Contractor shall apply primer to all prepared metal surfaces on same day (within 8 hrs.) as preparation operations. Apply primer and Paints according to Division 09 Section "High Performance Coating" and in strict accordance with manufacturer's recommendations.

WI 45.4 PAINT CONCRETE/MASONRY SURFACES (STAIRTOWER #1)

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision and incidental necessary to locate, layout, prepare surfaces and apply masonry paint onto concrete and/or masonry surfaces inside the designated stairtower.

B. Materials

1. Paint materials shall be as specified in Division 09 Section "Exterior Painting."

C. Execution

1. Contractor shall locate and layout Work areas as indicated on Drawings.
2. Contractor shall prepare surface to be painted in accordance with Division 09 Section "Exterior Painting" and manufacturer's recommendations.
3. Contractor shall clean existing painted concrete/masonry surfaces using minimum of detergent and brush scrubbing, and pressure washing.
4. Unpainted CMU block shall have block filler/primer product installed prior to painting.
5. Contractor shall prepare surface to be painted in accordance with referenced specification section and manufacturer's recommendations.
6. Protect adjacent non-painted surfaces from being painted. Mask off adjacent features not receiving paint.
7. Contractor shall apply primer and/or paint in accordance with referenced specification section listed in "Materials" above and manufacturer's recommendations.

WI 45.5 PAINT STANDPIPE

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to access existing standpipe system, prepare standpipe horizontal lines and vertical risers , and apply paint to the existing system.

B. Materials

1. Paint materials shall be as specified in Division 09 Section "Exterior Painting."

C. Execution

1. Contractor shall match the existing "Red" color to match the existing system.
2. Areas that do not receive paint application (valves, caps, etc.) shall be protected from paint application..
3. Contractor shall insure proper paint thickness is applied and repair all defects (holidays, runs, pin holes) that may occur to application.
4. Contractor shall apply primer to galvanized section of line to accept top coat application.
5. Contractor shall prepare surface to be painted in accordance with Division 09 Section "Exterior Painting" and manufacturer's recommendations.

WI 45.6 CLEAN AND PAINT GALVANIZED FRAMING – SPOT LOCATIONS @ EXPANSION AREA

B. Scope of Work

6. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to access existing structural framing where zinc hydroxide straining and surface corrosion appear on limited/isolated areas of the existing galvanized beam and column framing, remove the zinc hydroxide and prepare rusted surfaces for limited application of protective paint coating to these areas.

D. Materials

1. Paint materials shall be as specified in Division 09 Section "High Performance Coating".

E. Execution

1. Contractor shall locate and remove the heavy zinc hydroxide stains from the framing using methods that do not damage the galvanized coating. Upon cleaning and removal, the areas will be examined for application of paint coating.
2. Areas where surface corrosion appear shall be prepared to receive a primer and top coat application to match as close as possible the existing color on the framing.
3. Contractor shall insure proper paint thickness is applied to the affected areas to protect them against further corrosion.
4. Contractor shall apply primer to accept top coat application.
5. Contractor shall prepare surface to be painted in accordance with manufacturer's recommendations.

WI 46.0 STRUCTURAL STEEL

WI 46.0 STRUCTURAL ALLOWANCE – INSPECTION

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to access designated steel framing areas identified for structural steel repair, clean corrosion from the steel surface at designated areas

by grinding and descaling corrosion to sound base material for thickness inspections to be performed by the Engineer. Refer to detail Series 46.0 for specific repair requirements.

B. Materials - None

C. Execution

1. The allowance shall be established to compensate the contractor for time, materials and equipment required to access and clean the designated corroded steel framing areas to allow for inspection.
2. Contractor shall provide a record documenting labor hours materials, and equipment used to complete the above work to the Engineer for approval.
3. Upon Engineers direction, repairs shall be provided as indicated at designated locations using the repair details in Series 46.0 or as directed by the Engineer. Repair work will be paid for under the designated repair type/details.

WI 46.1A FLANGE REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, construction shoring, supervision, and incidentals necessary to fabricate, prepare and install supplemental steel assembly to repair and strengthen flange sections where designated by Engineer. Refer to detail 46.1A for specific requirements.

B. Materials

2. Angles, plates, channels, and bolts shall be as specified in Section "Structural Steel Framing".

C. Execution

1. Contractor shall prepare framing to receive repairs per designated detail or as directed by the Engineer.
2. Contractor shall notify Engineer when repairs are completed for inspection by Owners testing agency. All welds shall be cleaned to allow for visual and/or NDE testing.
3. Bare metal surfaces shall be prepared and field primed with a zinc rich primer. .

WI 46.1B BOTTOM FLANGE REPAIR

- A. Refer to Work Item 46.1A, "Flange Repair" for Scope of Work, materials and procedure associated with this Work Item. Refer to Detail 46.1B for specific requirements.

WI 46.1C BEAM REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, construction shoring, supervision, and incidentals necessary to fabricate, prepare and install supplemental steel to repair and strengthen beam sections where designated by Engineer. Refer to detail 46.1C for specific requirements.

B. Materials

1. Steel materials shall be as specified in Section "Structural Steel Framing".

C. Execution

1. Contractor shall prepare framing to receive repairs per designated detail or as directed by the Engineer.
2. Contractor shall notify Engineer when repairs are completed for inspection by Owners testing agency. All welds shall be cleaned to allow for visual and/or NDE testing.
3. Bare metal surfaces shall be prepared and field primed with a zinc rich primer. .

WI 46.1D STIFFENER AND GUSSET PLATE REPLACEMENT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, construction shoring, supervision, and incidentals necessary to fabricate, prepare and install supplemental steel to repair strengthening to steel framing sections where designated by Engineer. Refer to detail 46.1D for specific requirements.

B. Materials

1. Steel materials shall be as specified in Section "Structural Steel Framing".

C. Execution

1. Contractor shall prepare framing to receive repairs per designated detail or as directed by the Engineer.
2. Contractor shall notify Engineer when repairs are completed for inspection by Owners testing agency. All welds shall be cleaned to allow for visual and/or NDE testing.
3. Bare metal surfaces shall be prepared and field primed with a zinc rich primer. .

WI 46.1E ANGLE SUPPORT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, construction shoring, supervision, and incidentals necessary to fabricate, prepare and install supplemental steel angle support to repair and strengthen steel framing sections where designated by Engineer. Refer to detail 46.1E for specific requirements.

B. Materials

1. Steel materials shall be as specified in Section "Structural Steel Framing".

D. Execution

1. Contractor shall prepare framing to receive repairs per designated detail or as directed by the Engineer.
2. Contractor shall notify Engineer when repairs are completed for inspection by Owners testing agency. All welds shall be cleaned to allow for visual and/or NDE testing.
3. Bare metal surfaces shall be prepared and field primed with a zinc rich primer. .

WI 46.1F COLUMN FLANGE REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, construction shoring, supervision, and incidentals necessary to fabricate, prepare and install supplemental steel to repair and strengthen column flange sections where designated by Engineer. Refer to detail 46.1F for specific requirements.

B. Materials

1. Steel materials shall be as specified in Section "Structural Steel Framing".

C. Execution

1. Contractor shall prepare framing to receive repairs per designated detail or as directed by the Engineer.
2. Contractor shall notify Engineer when repairs are completed for inspection by Owners testing agency. All welds shall be cleaned to allow for visual and/or NDE testing.
3. Bare metal surfaces shall be prepared and field primed with a zinc rich primer.

WI 46.1G COLUMN REPAIR

- A. Refer to Work Item 46.1A, "Flange Repair" for Scope of Work, materials and procedure associated with this Work Item. Refer to Detail 46.1G for specific requirements.

WI 46.1H COLUMN FLANGE REPAIR

- A. Refer to Work Item 46.1A, "Flange Repair" for Scope of Work, materials and procedure associated with this Work Item. Refer to Detail 46.1G for specific requirements.

WI 46.2 SUPPLEMENTAL STEEL BEAM INSTALLATION @ DAMAGED FILIGREE PLANK

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, construction shoring, supervision, and incidentals necessary to fabricate, prepare and install supplemental structural steel framing to existing steel beams to support damaged

precast filigree planks where designated. Refer to detail 46.2 for specific requirements.

B. Materials

1. Angles, plates, channels, beam, and mounting hardware shall be as specified in Section "Structural Steel Framing".
2. Grout materials shall be as specified in Division 3 Section "Prepackaged Repair Mortar".

C. Execution

1. Contractor shall prepare framing shop drawing for installation of sub framing to engineer for review and approval.
2. Contractor shall provide all shoring for installation of new sub-framing. Contractor to notify Engineer when framing installation is completed for inspection by Owners testing agency. All welds shall be cleaned to allow for visual and/or NDE testing.
3. Bare metal surfaces shall be prepared and field primed with a zinc rich primer. .

FAÇADE WORK BELOW

WI 74.0 JOINT AND SEALANT REPAIR

WI 74.1 ISOLATION JOINT SEALANT REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate existing isolation joints, remove existing flexible joint sealant material and compressible filler/backing materials, prepare substrate, including removal of any debris/material within the full depth of the isolation joint, and install new backer rod, bond breaker and flexible joint sealant material. Refer to Detail 74.1 for specific requirements.

B. Materials

1. Backer rods, sealants, compressible closed cell foam filler, and bond breaker tape shall be as specified in Division 07 Section "Architectural Joint Sealants."

C. Execution

1. Contractor shall locate and mark all isolation joints requiring placement as detailed on Drawings.
2. Contractor shall remove existing joint sealant and filler/backing material. Care shall be taken not to damage adjacent masonry or architectural features.
3. Any debris/material within the full depth of the isolation joint shall be removed.

4. Joint shall be thoroughly cleaned by grinding to remove all mortar, residual joint filler material, joint sealant material, and unsound brick and/or masonry. Joint shall be air blasted to remove remaining debris.
5. Damage to surrounding brick shall be repaired by Contractor at no cost to Owner.
6. Contractor shall install new compressible filler backer rod and joint sealant in accordance with Details and manufacturer's recommendations.
7. Adjoining masonry surfaces on both sides of joint shall be protected/masked prior to sealing joint. Remove protection/masking material upon completion of sealing joint.
8. Sealed joints shall be neat in appearance. Poorly sealed or improperly sealed joints shall be removed and replaced at Contractor's expense.

WI 74.7 CAPSTONE JOINT REPAIR

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate existing precast capstone joints, remove existing flexible joint sealant material and backer rod, prepare substrate, and install flexible joint sealant material (including backer rod and bond breaker if required). Refer to Detail 74.7 for specific requirements.

B. Materials

1. Backer rods, sealants and bond breaker tape shall be as specified in Division 07 Section "Architectural Joint Sealants."

C. Execution

1. Contractor shall locate and mark all joints requiring replacement as detailed on Drawings.
2. Contractor shall remove existing joint sealant and backer rod. Care shall be taken not to damage adjacent masonry or architectural features.
3. Joint shall be thoroughly cleaned by grinding to remove all mortar, residual joint filler material, joint sealant material, and unsound capstone material for depth of new joint sealant. Joint shall be airblasted to remove remaining debris.
4. Unnecessary damage to surrounding wall assembly shall be repaired by Contractor at no cost to Owner.
5. Contractor shall install new joint sealant in accordance with specifications."
6. Adjoining masonry surfaces on both sides of joint shall be covered with tape prior to sealing joint. Remove tape upon completion of sealing control joint.
7. Sealed joints shall be neat in appearance. Poorly sealed or improperly sealed control joints shall be removed and replaced at Contractor's expense.

WI 76.0 CRACK REPAIR AND TUCKPOINTING

WI 76.1 ROUT AND SEAL FAÇADE CRACKS

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to locate, prepare and seal random cracks in façade assembly. Refer to Detail 76.1 for specific requirements.

B. Materials

1. Approved materials for use in this Work are specified in Division 07 Section "Architectural Joint Sealants."

C. Execution

1. Contractor shall thoroughly clean and inspect façade assembly elements for cracks. Those identified as either greater than 0.03 in. wide or showing evidence of water infiltration shall be sealed. All cracks and joints identified for repair shall be marked with chalk to aid in precision routing. Obtain depths to any embedded reinforcing in area of repair by use of a pachometer (rebar locator). Determine depth of electrical conduit (metal or plastic). Do not exceed this depth of routing where the crack to be repaired crosses the embedded items. Damage to embedded items will require repair or replacement at no cost to the Owner.
2. Cracks shall be ground or saw cut to an adequate width and depth as required by Work Item Detail. Routing shall be performed by mechanized device that has positive mechanical control over depth and alignment of cut.
3. Cavities shall be thoroughly cleaned by either sandblasting or grinding to remove all laitance, unsound façade material and any compounds which may interfere with adhesion. Groove shall be air blasted to remove remaining debris.
4. Sealant installation procedures shall be in accordance with referenced specifications for selected material and sealant manufacturer's instructions.

WI 76.3 MASONRY TUCKPOINTING

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to tuckpoint defective, cracked, broken or eroded joints in existing brick work. Refer to detail 76.3 for specific requirements.

B. Materials

1. Portland Cement: ASTM C 150, Type I or II.
2. Quicklime: ASTM C5; pulverized lime.
3. Hydrated Lime: ASTM C 207, Type N.
4. Aggregate for Mortar: ASTM C 144; except for joints less than 0.25 in., use aggregate graded with 100% passing the No. 16 sieve.
5. Water: Potable
6. Mortar shall match existing color.

C. Execution

1. Contractor shall locate and mark all Work areas. Engineer/Architect shall verify locations prior to start of Work.
2. All defective joints which are cracked, broken, or eroded to depth of 0.5 in. or more shall be tuckpointed.
3. Joints to be tuckpointed shall be cut back to depth of 0.75 in., or to full depth of deterioration. Use mechanically operated blades only to perform cutting. Joint at back of cut shall have square shoulder. Remove all mortar from upper and lower surfaces and sides of mortar joint being prepared.
4. Contractor shall flush all mortar joints thoroughly with clean water under pressure prior to tuckpointing to remove all dust, dirt, and laitance. Brick shall be damp and free of excess water before tuckpointing commences. Take all necessary precautions to prevent water from entering cavity space during cleaning operations.
5. Tuckpointing shall be performed using Type N mortar in accordance with ASTM C270 using specified materials.
6. Match existing mortar color. Mortar shall be dry and mixed thoroughly prior to adding water. Add one-half required mixing water and allow to stand 1 hour, then add balance of mixing water.
7. Press mortar into prepared joint using pointing tool 0.125 in. smaller than width of joint until joint is packed full. Finish point joint with pointing tool at least 0.125 in. wider than prepared joint.
8. Prior to initial set of mortar, tool joints to match existing.
9. Allow 3 to 7 days for mortar to harden prior to cleaning of brick wall.
10. Dispose of all accumulated material and leave premises in clean condition.
11. Masonry surfaces that become dirty or smeared during joint cutting and repointing of joint surfaces shall be cleaned with bristle brushes and plain water.
12. Unnecessary damage to surrounding brick shall be repaired by Contractor at no cost to Owner.

WI 76.4 GROUT JOINT REPAIR – PRECAST CORNICE

SCOPE OF WORK

- A. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to tuckpoint defective, cracked, broken or eroded joints in existing stone cornice. Refer to detail 76.4 for specific requirements.
- B. Materials
 1. Portland Cement: ASTM C 150, Type I or II.
 2. Quicklime: ASTM C5; pulverized lime.
 3. Hydrated Lime: ASTM C 207, Type N.
 4. Aggregate for Mortar: ASTM C 144; except for joints less than 0.25 in., use aggregate graded with 100% passing the No. 16 sieve.
 5. Water: Potable
 6. **Mortar shall match existing color.**
- C. Execution

1. Contractor shall locate and mark all Work areas. Engineer/Architect shall verify locations prior to start of Work.
2. All defective joints which are cracked, broken, or eroded shall be tuckpointed.
3. Joints to be tuckpointed shall be cut back to depth of 0.75 in., or to full depth of deterioration. Use mechanically operated blades only to perform cutting. Joint at back of cut shall have square shoulder. Remove all mortar from upper and lower surfaces and sides of mortar joint being prepared.
4. Contractor shall flush all mortar joints thoroughly with clean water under pressure prior to tuckpointing to remove all dust, dirt, and laitance. Brick shall be damp and free of excess water before tuckpointing commences. Take all necessary precautions to prevent water from entering cavity space during cleaning operations.
5. Tuckpointing shall be performed using Type N mortar in accordance with ASTM C270 using specified materials.
6. Match existing mortar color. Mortar shall be dry and mixed thoroughly prior to adding water. Add one-half required mixing water and allow to stand 1 hour, then add balance of mixing water.
7. Press mortar into prepared joint using pointing tool 0.125 in. smaller than width of joint until joint is packed full. Finish point joint with pointing tool at least 0.125 in. wider than prepared joint.
8. Prior to initial set of mortar, tool joints to match existing.
9. Allow 3 to 7 days for mortar to harden prior to cleaning of brick wall.
10. Dispose of all accumulated material and leave premises in clean condition.
11. Stone surfaces that become dirty or smeared during joint cutting and repointing of joint surfaces shall be cleaned with bristle brushes and plain water.
12. Unnecessary damage to surrounding brick shall be repaired by Contractor at no cost to Owner.

WI 80.0 BRICK/CONCRETE MASONRY UNIT FAÇADE

WI 80.1 REMOVE AND REPLACE FACE BRICK

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary for local brick removal and replacement due to fractures, cracks, broken or unsound brick. Refer to Detail 80.1 for specific requirements.

B. Materials

1. Materials shall be as specified in Division 04 Section "Unit Masonry."

C. Execution

1. Contractor shall locate and mark all brick to be replaced. Engineer/Architect shall verify replacement locations prior to start of Work.
2. Contractor shall remove all existing fractured, cracked, spalled, broken or structurally unsound brick and all brick damaged during removal and toothing work.

3. Internal structural steel exposed during removal process shall be cleaned to bare metal per SSPC-SP-11, and coated with high performance coating. Coat with one coat of corrosion resistant paint prior to brick replacement.
4. Entire cavity of removed brick shall be thoroughly cleaned of all mortar from top, bottom, and both sides of all brick surrounding new brick work. Do not allow mortar droppings to accumulate in cavity space, in weep holes, or on flashing. Engineer/Architect shall inspect all cavities for condition prior to commencement of new construction.
5. New brick veneer shall be anchored to backing with flexible metal ties embedded in masonry joints and attached to existing structure. Space veneer anchors at 16 in. o.c. vertically. Horizontal anchor spacing shall not exceed 24 in. o.c. Existing veneer anchors not damaged during brick removal may be reused at Contractor's option. Clean existing anchors prior to replacing brick veneer.
6. Flush cavity thoroughly with water to remove all dust and laitance prior to brick replacement. Take all necessary precautions to prevent water from entering cavity space during cleaning operations. Allow excess water to run off. New brick or existing brick removed from building shall be laid in full bed of mortar while wall is still damp. All brick repair work shall be flush with existing.
7. New brick work is to be toothed into existing brick work.
8. All bed and head joints shall be fully filled with mortar. Collar joints shall remain clear of mortar in single wythe veneer construction. For multi-wythe brick construction, fill collar joints.
9. Prior to initial set of mortar, tool joints to match existing.
10. Adequate weather protection shall be installed over all areas left open at completion of each day's work.
11. Allow 3 to 7 days for mortar to harden prior to cleaning of brick wall.
12. Dispose of all accumulated material and leave premises in clean condition.
13. Masonry surfaces that become dirty or smeared during joint cutting and repointing of joint surfaces shall be cleaned with bristle brushes and plain water.
14. Unnecessary damage to surrounding brick shall be repaired by Contractor at no cost to Owner.

WI 80.2 REMOVE AND REPLACE ROWLOCK CAP

- A. Refer to Work Item 80.1, "Remove and Replace Face Brick" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 80.2 for specific requirements. Refer to detail 80.2 for specific information Masonry repair to the rowlock and second course (running bond) shall match brick color and coursing .

WI 80.3 REMOVE AND REPLACE CONCRETE MASONRY UNIT

- A. Refer to Work Item 80.1, "Remove and Replace Face Brick" for scope of Work, materials and procedure associated with this Work Item. Refer to Detail 80.3 for specific requirements. Note specific requirements for CMU reinforcing called out on Detail. CMU block size to match existing.

WI 80.4 REMOVE AND REPLACE CAPSTONE/ FLASHING

A. Scope of Work

1. This work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to remove existing capstone, clean top of wall, and prepare CMU for flashing and capstone installation. Work includes fabricating new precast capstone to match the existing capstones, installing grout fill in top of wall coursing, installing new stone anchors, fabricating, and installing new cap flashing, and installing new precast capstone with grouted joints under this Item. Refer to detail 80.4 for specific requirements. Concrete masonry unit that may require repairs below the capstone shall be performed per detail and work 80.3.

A. Materials

1. Flashing shall be as specified in Division 04 Section "Unit Masonry."
2. Concrete masonry shall be as specified in Division 04 "Unit Masonry".
3. Precast material shall be as specified in Section "Cast Stone Masonry".

B. Execution

1. Contractor shall remove capstones and prepare wall for new flashing and new capstones.
2. Damaged or deteriorated concrete masonry units shall be performed per work item 80.3 at and around parapet locations prior to flashing installation.
3. For typical conditions, new stone anchors below capstones will have been installed incidental to other stone repair Work Items.
4. Contractor shall, with direction of engineer, inspect the existing anchors located below the existing capstones for adequate condition.
5. If supplemental anchors are required, install as directed by Engineer.
6. Install new through wall flashing on a continuous bed of mortar. Extend flashing $\frac{1}{2}$ " past face at wall – each side
7. Install new capstones on top of through wall flashing with continuous bed of mortar.
8. Incorporate stainless steel shear pins to secure capstone to parapet wall, and provide waterproof seal between flashing and pin.
9. Finished installation shall be a physically stable capstone, anchored to the parapet wall through the shear pins and the interlocking flashing pattern and the mortar bed.
10. Flashing shall be continuous, and lap joints in individual flashing sections shall be fabricated and used so continuous flashing is water tight.
11. Removal of existing stone, preparing of building façade location to accept stone, and installation of new stone, including all new stone anchors and flashing shall be paid for under this Work Item.

WI 80.5 REMOVE/REPLACE PARAPET WALL

A. Scope of Work

1. This work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to stabilize, demolish, and rebuild parapet wall area as indicated on the Drawings. Contractor shall be responsible for parapet wall

stability at all times during construction operations. Refer to Detail Series 80.5 for specific requirements.

B. Materials

1. Brick, CMU, and flashing materials shall be as specified in Division 04 Section "Unit Masonry."
2. Mortar shall be as specified in Division 04 Section "Unit Masonry".
3. Sealant materials shall be as specified in Division 07 Section "Architectural Joint Sealants."
4. Precast capstone material shall be as specified in Section Cast Stone Masonry.

C. Execution

1. Contractor shall brace and stabilize existing wall as required prior to start of work.
2. Contractor shall remove any elements scheduled to be salvaged from within the work limits shown. Contractor is responsible for storage of salvaged elements so they are protected from damage while they are removed from the building.
3. Remaining wall shall be demolished until the supporting elements of the parapet are exposed. All vertical reinforcement shall remain.
4. Install new reinforcing material in bond beam and reinstall existing parapet connection angle to the structure.
5. Rebuild new parapet wall as shown in the referenced Detail, per the Execution sections of the referenced specification sections.
6. Reset any salvaged elements in their original design positions.

WI 80.6 REMOVE/REPLACE PARAPET WALL WITH TOP RAIL

A. Scope of Work

7. This work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to stabilize, demolish, and rebuild parapet wall as indicated on the Drawings. Contractor shall be responsible for parapet wall stability at all times during construction operations. Refer to Detail Series 80.4 for specific requirements. Contractor shall remove ornamental railing and store railing until reinstallation.

B. Materials

1. Brick and CMU and flashing materials shall be as specified in Division 04 Section "Unit Masonry."
2. Mortar shall be as specified in Division 04 Section "Unit Masonry".
3. Sealant materials shall be as specified in Division 07 Section "Architectural Joint Sealants."
4. Precast capstone material shall be as specified in Section Cast Stone Masonry.

C. Execution

1. Contractor shall brace and stabilize existing wall as required prior to start of work.
2. Contractor shall remove any elements scheduled to be salvaged from within the work limits shown. Contractor is responsible for storage of salvaged elements so they are protected from damage while they are removed from the building.
3. Remaining wall shall be demolished until the supporting elements of the parapet are exposed. All vertical reinforcement shall remain.
4. Install new reinforcing material in bond beam and reinstall existing parapet connection angle to the structure.
5. Rebuild new parapet wall as shown in the referenced Detail, per the Execution sections of the referenced specification sections.
6. Reinstall the ornamental metal railing and any salvaged elements in their original design positions.

WI 80.7 RESET PRECAST UNIT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to remove existing mortar where the precast stone header units have shifted out from the building façade, reset the unit in alignment to the façade to their original building location in a square and plumb “like original” condition. See Detail Series 81.1 for specific requirements.
2. Contractor is responsible for maintaining stability of stones remaining in place on the building while resetting precast stone units.

B. Materials/Equipment

1. Mortar shall be as specified in Division 04 Section “Unit Masonry”.

C. Execution

1. Contractor shall locate and verify with Engineer/Architect precast header stone units requiring resetting.
2. All stones and building elements shall be adequately secured and stabilized during construction operations.
3. Contractor shall provide pedestrian and vehicular protection in areas where stones are being actively worked on overhead.
4. Stone resetting shall be completed in conjunction with other building restoration work, including, but not limited to shelf angle cleaning and painting, building frame and infill repairs.
5. Coordinate with other Work Items to address stones with damage to the extent that replacement is required. Salvage replaced stones for Dutchman repairs.

WI 91.0 FAÇADE COATING/SEALING

WI 91.3 PENETRATING SEALER

A. Scope of Work

1. Work consists of providing all labor, materials, equipment, supervision, and incidentals necessary to prepare masonry surfaces and install penetrating sealer system on the North and West Elevation of the exterior façade surfaces where indicated on the drawings.

B. Materials

1. Penetrating sealer system materials shall be as specified in Division 07 Section "Water Repellents."

C. Execution

1. All surfaces scheduled to receive penetrating sealer system shall be identified by Contractor.
2. Surfaces shall be cleaned/prepared in accordance with referenced specification section(s). All surfaces shall be treated with a minimum water pressure washing.
3. Use of water pressure washing requires adequate drying time before application to achieve proper penetration.
4. Mask all surfaces not scheduled for penetrating sealer application to prevent damage to architectural elements. Contractor caused damage to elements not scheduled for sealer application shall be cleaned and/or repaired to satisfaction of the Owner and at no additional cost to Owner.
5. Overhead and vertical surface application shall be by brush or pressure sprayer.
6. Sealer application shall be as specified in referenced specification section listed in "Materials" above.

WI 95.0 DOORS AND WINDOWS

WI 95.1 REPLACE WINDOW FRAME/FAÇADE PERIMETER JOINT

A. Scope of Work

1. Work consists of furnishing all labor, materials, equipment, supervision, and incidentals necessary to remove existing joint sealant, prepare substrates and reseal failed sealant locations between window frame and façade. See Detail 95.1 for specific requirements.

B. Materials

1. Sealants shall be as specified in Division 07 Section "Architectural Joint Sealants."

C. Execution

1. Contractor shall locate and mark all locations requiring resealing as detailed on Drawings.
2. Contractor shall remove existing joint sealant. Care shall be taken not to damage adjacent façade, window components or other surrounding features.

3. Joint shall be thoroughly cleaned by grinding to remove all debris, residual joint filler material and joint sealant material. Joint shall be air blasted to remove remaining debris after preparation.
4. Unnecessary damage to surrounding elements shall be repaired by Contractor at no cost to Owner.
5. Contractor shall install new joint sealant in accordance with Details and manufacturer's recommendations.
6. Sealed joints shall be neat in appearance. Poorly sealed or improperly sealed joints shall be removed and replaced at no additional cost to Owner.

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SECTION 02 51 30 - GENERAL CONCRETE SURFACE PREPARATION

PART 1 - GENERAL

1.1 DEFINITIONS

- A. **DELAMINATIONS:** Fracture planes, "internal cracks," within concrete. Typically these fractures are parallel to the member face and vary in depth.
- B. **NEAR-VERTICAL CHIPPED EDGES:** Provide an edge dressed to within 20° of perpendicular of finished surface.
- C. **SPALLS:** Potholes, cavities or voids in concrete. Usually result of delamination migrating to face of concrete member. When fracture finally reaches surface, concrete encompassed by delamination breaks away, resulting in spall.
- D. **UN SOUND CONCRETE:** Concrete exhibiting one or more of:
 - 1. Incipient fractures present beneath existing delaminated or spalled surfaces.
 - 2. Honeycombing.
 - 3. Friable or punky areas.
 - 4. Deterioration from freeze-thaw action.
- E. **SCALING:** Deterioration which attacks mortar fraction (paste) of concrete mix. First appears as minor flaking and disintegration of concrete surface. Scaling eventually progresses deeper into concrete, exposing aggregate which breaks away.
- F. **SHOTBLASTING:** Scarification of concrete surfaces using an abraded metal shot-rebound. See ICRI Guideline 03732 "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays."

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION (NOT APPLICABLE)

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SECTION 02 51 40 - SURFACE PREPARATION FOR PATCHING AND OVERLAY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the provision of all labor, materials, equipment, supervision and incidentals necessary to locate and remove all delaminated and unsound concrete, all existing failed patches, all existing surface spalls and potholes, and preparation of cavities created by removal to receive concrete patching material.
- B. This Section includes the provision of all labor, materials, equipment, supervision and incidentals necessary to prepare existing sound concrete slab surfaces to receive bonded concrete overlay.
- C. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 03 Section "Cast-in-Place Concrete – Restoration"
 - 2. Division 03 Section "Prepackaged Repair Mortar"

1.3 REFERENCES

- A. "Specifications for Structural Concrete for Buildings" (ACI 301) by American Concrete Institute, herein referred to as ACI 301, is included in total as specification for this structure except as otherwise specified herein.
- B. Comply with provisions of following codes, specifications and standards except where more stringent requirements are shown on Drawings or specified herein:
 - 1. "Concrete Repair Guide" (ACI 546R-04)

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 INSPECTION

- A. Floor Slabs:

1. Floor slab delaminations: locate by sounding surface with hammer, rod, or chain drag.
 2. When delaminated area is struck, distinct hollow sound is heard.
 3. Contractor: sound all designated floors for delaminations.
 4. Certain structural systems that contain thin slab thicknesses with Welded Wire Reinforcement or other small diameter reinforcing, such as waffle slab or precast tees, may have significant deterioration without evidence of delaminations. These structural systems require qualified personnel to provide additional inspections, primarily visual in nature, to define the extent of deterioration.
 5. Contractor: Visually inspect thin slab thicknesses with small diameter reinforcing for deterioration.
- B. Vertical and Overhead Surfaces:
1. Vertical and overhead surface delaminations: locate by sounding appropriate member with hammer or rod.
 2. Cracks, usually horizontal in orientation along beam faces, and vertical in orientation near column corners are indicators of delaminated concrete.
 3. Contractor: sound only vertical and overhead surfaces that show evidence of cracking and/or salt and water staining.
- C. Delaminated areas, once located by Contractor, shall be further sounded to define limits. Mark limits with chalk or paint.
- D. Contractor: locate spalls by visual inspection and mark boundaries with chalk or paint after sounding surface.
- E. Engineer/Architect will define and mark additional unsound concrete areas for removal, if required.
- F. Areas to be removed shall be as straight and rectangular as practical to encompass repair and provide neat patch.
- G. Contractor: Locate and determine depth of all embedded REINFORCEMENT, POST-TENSIONING TENDONS, and ELECTRICAL CONDUIT in repair area and mark these locations for reference during concrete removal. Do **NOT** nick or cut any embeds unless approved by Engineer/Architect.
- H. For overlay installation, boundaries of overlay areas will be as defined in project drawings and verified by Engineer/Architect.

3.2 PREPARATION

- A. Temporary shoring may be required at concrete floor repair areas exceeding 5 sq ft and at any beam, joist, or column repair. Construction shoring is required at all concrete topping strip repairs: Review all marked removal and preparation areas and request clarification by Engineer/Architect of shoring requirements in questionable areas. Shores shall be in place prior to concrete removal and cavity preparation in any area requiring shores.

- B. Delaminated, spalled and unsound concrete floor areas: mark boundaries. All concrete shall be removed from within marked boundary to minimum depth of 0.75 in. using 15 to 30 lb chipping hammers equipped with chisel point bits. When directed by Engineer/Architect, chipping hammers less than 15 lb shall be used to minimize damage to sound concrete. Near vertical chipped edge shall be provided along perimeter of repair area where shown on drawings. Areas to be removed shall encompass repair and provide uniform cavity surface. If delaminations exist beyond minimum removal depth, chipping shall continue until all unsound and delaminated concrete has been removed from cavity.
- C. Where embedded reinforcement or electrical conduit is exposed by concrete removal, exercise extra caution to avoid damaging it during removal of unsound concrete. If bond between exposed embedded reinforcement and adjacent concrete is impaired by Contractor's removal operations, Contractor shall perform additional removal around and beyond perimeter of reinforcement for minimum of 0.75 in. along entire length affected at no cost to Owner.
- D. If rust is present on embedded reinforcement where it enters sound concrete, additional removal of concrete along and beneath reinforcement required. Additional removal shall continue until non-rusted reinforcement is exposed, or may be terminated as Engineer/Architect directs.
- E. Sawcut patch and overlay boundaries to depth of 0.75 in. into floor slab, unless otherwise noted. No sawcutting required at overlay boundaries abutting existing vertical surface (wall, beam, curb, etc.). For vertical and overhead surfaces marked boundary may be sawcut, ground or chipped to depth of 0.5 in. to 0.625 in. into existing concrete, measured from original surface. All edges shall be straight and patch areas square or rectangular-shaped. Diamond blade saw or grinder with abrasive disk suitable for cutting concrete is acceptable for performing work. Edge cut at boundary shall be dressed perpendicular to member face. It shall also be of uniform depth, for entire length of cut. Exercise extra caution during sawcutting to avoid damaging existing reinforcement (ESPECIALLY PRE-STRESS STANDS IN PRECAST PLANKS) and electrical conduit and any other embedded items near surface of concrete. Any damage to existing reinforcement, post-tensioning tendons or sheathing during removals shall be repaired by Contractor with Engineer/Architect-approved methods at no additional cost to Owner.
- F. All sound surfaces (surfaces not requiring spall or delamination repair as previously discussed in this section) to receive overlay shall be heavy abrasive blasted or heavy shotblasted prior to overlay placement, to produce a final concrete surface profile matching ICRI CSP.

3.3 INSPECTION OF REPAIR PREPARATION

- A. After removals are complete, but prior to final cleaning, exposed concrete surfaces and exposed reinforcement shall be inspected by Contractor and verified by Engineer/Architect for compliance with requirements of this Section. Where Engineer/Architect finds unsatisfactory surface or cavity preparation, Engineer/Architect shall direct Contractor to perform additional removals. Engineer/Architect shall verify areas after additional removals.

- B. Contractor shall inspect embedded reinforcement and conduits exposed within cavity for defects due to corrosion or damage resulting from removal operations. Contractor shall notify Engineer/Architect of all defective and damaged reinforcement or conduits. Replacement of damaged or defective reinforcement or conduits shall be performed according to this Section and as directed by Engineer/Architect.
- C. After inspections of exposed surfaces and reinforcement are complete, Engineer/Architect and Contractor shall measure and document removal and replacement quantities for payment, as required.

3.4 REINFORCEMENT AND EMBEDDED MATERIALS IN REPAIR AREAS

- A. All embedded reinforcement exposed during surface preparation that has lost more than 20% (10% if 2 or more consecutive parallel bars and/or tendons are affected) of original cross-section due to corrosion shall be considered DEFECTIVE. All non-defective exposed reinforcement that has lost section to extent specified above as direct result of Contractor's removal operations shall be considered DAMAGED.
- B. **Embedded materials** including, but not limited to, electrical conduit, **shall be protected by Contractor** during removal operations. **Damage due to removal operations shall be repaired by Contractor in accordance with national code requirements at no cost to Owner.** Embedded materials which are defective due to pre-existing conditions may be repaired or replaced by Contractor or abandoned at Owner's option and cost.
- C. Supplement defective or damaged embedded reinforcement by addition of reinforcement of equal diameter with Class "B" minimum splice per ACI 318 beyond damaged portion of reinforcement. Secure new reinforcement to existing reinforcement with wire ties and/or approved anchors. Supplemental reinforcement shall be ASTM A615 Grade 60 steel installed in accordance with Division 03 specification Sections. Tendon supplement or repair materials, when applicable, shall be as required by Section "Work Items."
- D. Loose and supplemental reinforcement exposed during surface preparation shall be securely anchored prior to concrete placement. Loose reinforcement shall be adequately secured by wire ties to bonded reinforcement or shall have drilled-in anchors installed to original concrete substrate. Drilled-in anchors shall be Powers "Tie-Wire Lok-Bolt" anchors, ITW Ramset/Red Head "TW-1400" anchor, or approved equivalent. Supplemental reinforcing needed to be held off substrate shall be adequately secured by drilled-in anchors installed to original concrete substrate with Powers "Tie-Wire Spike", ITW Ramset/Red Head Redi-Drive "TD4-112" anchors, or approved equivalent. Engineer/Architect will determine adequacy of wire ties and approve other anchoring devices prior to their use. Securing loose and supplemental reinforcement is incidental to surface preparation and no extras will be allowed for this Work.
- E. Concrete shall be removed to provide minimum of 3/4 in. clearance on all sides of defective or damaged exposed embedded reinforcement that is left in place. Minimum of 1.5-in. concrete cover shall be provided over all new and existing reinforcement.

Concrete cover over reinforcement may be reduced to 1 in. with Engineer/Architect's approval if coated with an approved epoxy resin.

- F. Supplemental reinforcement and concrete removals required for repairs of defective or damaged reinforcement shall be paid for as follows:
 - 1. Concrete removals and supplemental reinforcement required for repairs of DEFECTIVE reinforcement shall be paid for by Owner at unit price bid.
 - 2. Concrete removals and supplemental reinforcement required for repairs of DAMAGED reinforcement shall be paid for by Contractor.

3.5 CLEANING OF REINFORCEMENT WITH DELAMINATION AND SPALL CAVITIES

- A. All exposed steel shall be cleaned of rust to bare metal by sandblasting. Cleaning shall be completed immediately before concrete placement to insure that base metal is not exposed to elements and further rusting for extended periods of time. Entire bar diameter is to be cleaned.
- B. After all sandblasting operations and cleanup are completed, paint all exposed steel with an approved epoxy. Protect prepared surfaces from damage prior to and during concrete placement.

3.6 PREPARATION OF CAVITY FOR PATCH PLACEMENT

- A. Floor slab and cavity surfaces will be examined prior to commencement of concrete placement operations. Sounding surface shall be part of examination. Any delamination noted during sounding shall be removed as specified in this Section.
- B. Cavities prepared by chipping or other impact methods shall be sandblasted to remove material that may impair concrete bonding. Sound concrete surfaces shall be prepared by shotblasting as previously specified in this section. Airblasting is required as final step to remove all debris including sand and dust. All debris shall be removed from site prior to commencement of concrete placement, bonding agent preparation, etc. as specified in Division 03 Sections.

END OF SECTION 02 51 40

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SECTION 03 30 21 - CAST-IN-PLACE CONCRETE RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section specifies cast-in-place concrete, including reinforcement, concrete materials, mix design, placement procedures, and finishes.
- B. Work in other Sections related to Cast-in-Place Concrete:
 - 1. Division 01 Section "Project Management and Coordination."
 - 2. Division 01 Section "Quality Control."
 - 3. Division 01 Section "Submittal Procedures."
 - 4. Division 02 Section "Work Items."
 - 5. Division 02 Section "General Concrete Surface Preparation."
 - 6. Division 02 Section "Surface Preparation for Patching."
 - 7. Division 03 Section "Galvanic Anode Corrosion Protection."
 - 8. Division 07 Section "Traffic Coatings."
 - 9. Division 07 Section "Water Repellants."
 - 10. Division 07 Section "Expansion Joint Assemblies."
 - 11. Division 07 Section "Architectural Joint Sealants."
 - 12. Division 07 Section "Concrete Joint Sealants."
 - 13. Division 09 Section "Exterior Painting."
 - 14. Division 09 Section "High Performance Coating."
 - 15. Division 09 Section "Pavement Marking."

1.3 DEFINITIONS

- A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.4 SUBMITTALS

- A. General: In addition to the following, comply with submittal requirements in ACI 301.
- B. Product Data: For each type of manufactured material and product indicated.
- C. Design Mixes: For each concrete mix. Use form at end of this Section.

- D. Testing Agency: Promptly report all field concrete test results to Engineer, Contractor and Concrete Supplier.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed concrete work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- C. Source Limitations: Obtain each type of cement of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.
- D. Comply with ACI 301, "Specification for Structural Concrete," including the following, unless modified by the requirements of the Contract Documents.
 - 1. General requirements, including submittals, quality assurance, acceptance of structure, and protection of in-place concrete.
 - 2. Formwork and form accessories.
 - 3. Steel reinforcement and supports.
 - 4. Concrete mixtures.
 - 5. Handling, placing, and constructing concrete.
- E. Testing Agency Qualifications:
 - 1. Independent agency, acceptable to engineer, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- F. Testing Agency is responsible for conducting, monitoring and reporting results of all tests required under this Section. Testing Agency shall immediately report test results showing properties that do not conform to Project Specification requirements to Contractor's authorized on-site representative and to Owner's authorized on-site representative.
- G. Testing Agency: Submit following Field Test information for Project Concrete unless modified in writing by Engineer:
 - 1. Project name and location.
 - 2. Contractor's name.
 - 3. Testing Agency's name, address, and phone number.
 - 4. Concrete supplier.
 - 5. Date of report.
 - 6. Testing Agency technician's name (sampling and testing).
 - 7. Placement location within structure.
 - 8. Time of batching.
 - 9. Time of testing.

10. Elapsed time from batching at plant to discharge from truck at site.
11. Concrete mixture identification number.
12. Weather data:
 - a. Air temperatures.
 - b. Weather.
13. Field test data:
 - a. Date, time and place of test.
 - b. Slump.
 - c. Concrete Temperature.
 - d. Air content.
14. Compressive test data:
 - a. Cylinder number.
 - b. Age of concrete when tested.
 - c. Date and time of cylinder test.
 - d. Curing time (field and lab).
 - e. Cross-sectional area of cylinder.
 - f. Compressive strength.
 - g. Type of failure (at break).

1.6 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 117, "Standard Specifications for Tolerances for Concrete Construction and Materials."
2. ACI 214R, "Evaluation of Strength Test Results of Concrete."
3. ACI 301, "Specifications for Structural Concrete."
4. ACI 302.1R, "Guide for Concrete Floor and Slab Construction."
5. ACI 305R, "Hot Weather Concreting."
6. ACI 306.1, "Cold Weather Concreting."
7. ACI 308R, "Guide to Curing Concrete."
8. ACI 308.1, "Standard Specifications for Curing Concrete."
9. ACI 318, "Building Code Requirements for Structural Concrete & Commentary."
10. ACI 347, "Guide to Formwork for Concrete."
11. ACI 347.2 "Guide to Shoring/Reshoring of Concrete Multistory Buildings."

B. American Society for Testing and Materials (ASTM):

1. ASTM A 36, "Standard Specification for Carbon Structural Steel."
2. ASTM A 615, "Standard Specification for Deformed and Plain Carbon -Steel Bars for Concrete Reinforcement."
3. ASTM A 775, "Standard Specification for Epoxy-Coated Steel Reinforcing Bars."
4. ASTM A 884, "Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement for Reinforcement."

5. ASTM A1064, "Standard Specification for Carbon-Steel Wire and Welded Wire Steel Reinforcement, Plain and Deformed, for concrete."
6. ASTM C 31, "Standard Practice for Making and Curing Concrete Test Specimens in the Field."
7. ASTM C 33, "Standard Specification for Concrete Aggregates."
8. ASTM C 39, "Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens."
9. ASTM C 94, "Standard Specification for Ready-Mixed Concrete."
10. ASTM C 138, "Standard Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete."
11. ASTM C 143, "Standard Test Method for Slump of Hydraulic Cement Concrete."
12. ASTM C 150, "Standard Specification for Portland Cement."
13. ASTM C 171, "Standard Specification for Sheet Materials for Curing Concrete."
14. ASTM C 172, "Standard Practice for Sampling Freshly Mixed Concrete."
15. ASTM C 173, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method."
16. ASTM C 231, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method."
17. ASTM C 260, "Standard Specification for Air-Entraining Admixtures for Concrete."
18. ASTM C 309, "Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete."
19. ASTM C 494, "Standard Specifications for Chemical Admixtures for Concrete."
20. ASTM C 567, "Standard Test Method for Determining the Density of Structural Lightweight Concrete."
21. ASTM C 618, "Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete."
22. ASTM C 989, "Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars."
23. ASTM C 1218, "Standard Test Method for Water Soluble Chloride Ion in Mortar and Concrete."
24. ASTM C 1315, "Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete."

PART 2 - PRODUCTS

2.1 FORMWORK

- A. Furnish formwork and form accessories according to ACI 301, ACI 347, and ACI 347.2.

2.2 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M or ASTM A 706, Grade 60 (Grade 420), deformed.
- B. Epoxy-coated Reinforcing Bars: ASTM A775
- C. Plain-Steel Welded Wire Fabric: ASTM A 1064, fabricated from as-drawn steel wire into flat sheets, mats only. Roll stock prohibited.

- D. Epoxy-Coated Welded Wire Fabric: ASTM A884, fabricated from as-drawn steel wire into flat sheets, mats only. Roll stock prohibited.
- E. Provide bar supports according to CRSI's "Manual of Standard Practice." Use all-plastic bar supports when in contact with exposed concrete surface.

2.3 CONCRETE MATERIALS

- A. Ready Mixed Concrete: Obtain concrete from plant with current certification from:
 - 1. Concrete Materials Engineering Council.
 - 2. **New Hampshire** Department of Transportation.
 - 3. National Ready Mixed Concrete Association.
 - 4. Prestressed Concrete Institute.
- B. Portland Cement: ASTM C 150, Types I or II or Type I/II.
- C. Fly Ash: ASTM C618, Class C or Class F.
- D. Ground-Granulated Blast Furnace Slag: ASTM C989, Gr. 100 or higher.
- E. Silica Fume: ASTM C1240.
- F. Normal-Weight Coarse Aggregate: ASTM C 33, Crushed and graded limestone or approved equivalent, Class 5S uniformly graded, not exceeding **1/2 inch** nominal size. No cherts, opaline or crushed hydraulic-cement concrete is permitted.
 - 1. Combine Aggregate Gradation: Well graded from coarsest to finest with not more than 18 percent and not less than 8 percent retained on an individual sieve, except that less than 8 percent may be retained on coarsest sieve and on No. 50 sieve, and less than 8 percent may be retained on sieves finer than No. 50.
- G. Normal-Weight Fine Aggregate: **Natural** sand conforming to ASTM C 33 and having preferred grading shown for normal weight aggregate in ACI 302.1R, Table 5.1.
- H. Water: Potable and complying with ASTM C 1602.

2.4 ADMIXTURES

- A. General: Admixtures certified by manufacturer to contain no more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures. Do not use admixtures containing calcium chloride.
- B. General: Admixtures certified by manufacturer that all admixtures used are mutually compatible.
- C. Admixtures: Use admixtures according to manufacturer's written instructions.
 - 1. Use water-reducing or high-range water reducing admixture in concrete, as required, for placement and workability.

2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use high-range water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs, fiber reinforced concrete, and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.45.
 4. Use non-corrosive accelerator for all concrete, less than 8 inches thick, placed at air temperatures below 50 degrees Fahrenheit.
 5. Use corrosion-inhibiting admixture in parking structure slabs and other areas noted on drawings.
 6. Use alkali-silica reactivity inhibitor unless ready mix company confirms that the aggregates to be used on the job are non-reactive.
- D. Normal Water-Reducing Admixture: ASTM C 494, Type A.
1. Products: Subject to compliance with requirements, provide one of following:
 - a. "Eucon Series," Euclid Chemical Co.
 - b. "WRDA Series," W.R. Grace & Co.
 - c. "Master Pozzolith Series," or "Master PolyHeed Series," BASF Corporation.
 - d. "Plastocrete Series", Sika Corporation.
- E. Mid-Range Water-Reducing Admixture: ASTM C 494, Type A.
1. Subject to compliance with requirements, provide one of following:
 - a. "Eucon MR" or "Eucon X-15 and X-20," Euclid Chemical Co.
 - b. "Daracem Series" or "MIRA Series," W.R. Grace & Co.
 - c. "Master Polyheed Series," BASF Corporation.
 - d. "Sikaplast Series" or "Plastocrete Series", Sika Corporation.
 - e. "Polychem 1000" or "KB Series," General Resource Technology.
 - f. "Finishease-NC," Russ Tech Admixtures, Inc.
 - g. "OptiFlo Series" or "EcoFlo Series," Premiere Concrete Admixtures.
- F. High-Range, Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F.
1. Products: Subject to compliance with requirements, provide one of following:
 - a. "Eucon 37" or "Eucon SP-Series" or "Plastol Series," Euclid Chemical Co.
 - b. "Daracem Series" or "ADVA Series," W.R. Grace & Co.
 - c. "Master Rheobuild 1000", "PS 1466" or "Master Glenium Series," BASF Corporation.
 - d. "Sikament Series" or "Sika ViscoCrete Series," Sika Corporation.
 - e. "Melchem Series," General Resource Technology.
 - f. "Superflo 443" or "Superflo 2000 Series," Russ Tech Admixtures, Inc.
 - g. "EcoFlo Series" or "UltraFlo Series," Premiere Concrete Admixtures.
- G. Water-Reducing and Retarding Admixture: ASTM C 494, Type B or D.
1. Products: Subject to compliance with requirements, provide one of following:

- a. "Eucon Retarder-75", "Eucon DS" or "Eucon Stasis." Euclid Chemical Co.
 - b. "Daratard-17" or "Recover," W.R. Grace & Co.
 - c. "MasterSet R Series" or "MasterSet Delvo Series," BASF Corporation.
 - d. "Sikatard Series," or "Plastiment Series" or "Plastocrete Series," Sika Corporation.
- H. Air Entraining Admixture: ASTM C260.
- 1. Products: Subject to compliance with requirements, provide one of following:
 - a. "Air-Mix," "Eucon Air-Series" or "AEA-92," Euclid Chemical Co.
 - b. "Daravair Series" or "Darex Series," W.R. Grace & Co.
 - c. "Master Air AE90", or Master Air AE 200", or "Master Air VR10," BASF Corporation.
 - d. "Sika AEA Series," or "Sika AIR Series," Sika Corporation.
 - e. "ConAir Series," Premiere Concrete Admixtures.
 - f. Polychem "VR" or "VRC" or "Polychem AE," General Resource Technology.
 - g. "RSA-10," Russ Tech Admixtures, Inc.
- I. Non-Chloride, Non-Corrosive Water-Reducing, Accelerating Admixture: ASTM C 494, Type C or E.
- 1. Products: Subject to compliance with requirements, provide one of following:
 - a. "Eucon AcN-Series," "Accelguard 80," "Accelguard NCA," or "Accelguard 90," by Euclid Chemical Company.
 - b. "DCI," "PolaraSet," "Lubricon NCA," "Daraset" or "Gilco," by W.R. Grace & Co.
 - c. "MasterSet FP 20" or "MasterSet AC 534," by BASF Corporation.
 - d. "Sika Set NC," "Plastocrete 161FL", or "Sika Rapid-1," by Sika Corporation.
 - e. "Catexol 2000 RHE," by Axim Concrete Technologies.
 - f. "Polychem NCA" or "Polychem Super Set," General Resource Technology.
 - g. "LCNC-166," Russ Tech Admixtures, Inc.
- J. Corrosion Inhibiting Admixture shall be capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.
- 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. "Eucon CIA" or "Eucon BCN," Euclid Chemical Company.
 - b. "DCI" or "DCI-S," W.R. Grace.
 - c. "MasterLife CI 30," BASF Corporation.
 - d. "Sika CNI," Sika Corporation.
 - e. "Catexol 1000 CN-CI," Axim Concrete Technologies.
 - f. "Polychem CI," General Resource Technology.
 - g. "Russ Tech RCI," Russ Tech Admixtures, Inc.
 - 2. Add at rate of 3 gal/cu yd. of concrete, which shall inhibit corrosion to 9.9 lb of chloride ions per cu. yd. of concrete. Calcium Nitrite based corrosion inhibitor shall have a concentration of 30 percent, plus or minus 2 percent of solids content.

K. Shrinkage Compensating Admixture:

1. Design requires using materials with combined drying shrinkage characteristic of 0.04 percent maximum at 28 days. Proposed concrete mixture(s), using actual aggregates, admixtures and cement of the proposed mix for Project as detailed herein and in Drawings, shall meet criteria. Submit ASTM C 157 (may be modified by curing period duration) results for at least 3 specimens. Test takes 28 days minimum. Begin tests as soon as possible so final test results available for submittal to Engineer.
2. Provide powdered admixture used for the compensation and reduction of shrinkage in Portland Cement concrete. Its functional mechanism shall be based on the formation of an expansive Type G component, which produces a calcium hydroxide platelet crystal system based on calcium aluminate/calcium hydroxide, as specified in ACI 223.
3. Acceptable Product:
 - a. Conex by The Euclid Chemical Company.
 - b. "Eclipse Plus," W.R. Grace & Co.
 - c. "MasterLife SRA 20," BASF Corporation.
 - d. "Sika Control 40," Sika Corporation.
 - e. "SRA-157," Russ Tech Admixtures, Inc.

2.5 FIBER REINFORCEMENT

- A. Micro-Fiber: Monofilament polypropylene micro-fibers complying with ASTM C 1116, Type III, minimum 0.75 inches long.
1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Monofilament Micro-Fibers: Minimum dosage rate 1.0 pound per cubic yard of concrete.
 - 1) "Durafiber," Industrial Systems, Ltd.
 - 2) "Fibermesh 150," Propex Concrete Systems.
 - 3) "PSI-Fiberstrand 100," Euclid Chemical Co.
 - 4) "Grace Microfibers," W.R. Grace & Co., Inc.
 - 5) "MasterFiber Series," BASF Corporation.
 - 6) "Mighty-Mono," Forta Corp.
 - 7) "Polymesh," General Resource Technology.
 - 8) "Sika Fibers PPM," Sika Corporation.
 - b. Conform to ASTM C 1399 and have a minimal residual strength performance of level 3 at 2 mm of beam deflection.
 - B. Do not change volume of water used in mix when fibers are used. Offset any slump loss due to addition of fibers by addition of superplasticizer.
 - C. Conform to manufacturer's recommendations for quantity of fibers if higher than the minimum dosage rates.

- D. Fiber manufacturer or approved distributor: Provide services of qualified representative at pre-construction meeting, concrete pre-installation meeting and first concrete placement containing fibers.

2.6 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
 - 1. Evaporation Retarder:
 - a. AquaFilm J74 by Dayton Superior Corporation, Miamisburg, OH
 - b. Eucobar; Euclid Chemical Co.
 - c. E-Con; L&M Construction Chemicals, Inc.
 - d. MasterKure ER 50; BASF Corporation.
 - e. SikaFilm; Sika Corporation.
 - f. Sure-Film (J-74); Dayton Superior Corporation.
 - g. "EVRT", Russ Tech Admixtures, Inc.
 - h. "Barrier," Premiere Concrete Solutions.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry. Materials must be free of harmful substances, such as sugar or fertilizer, or substances that may discolor the concrete. To remove soluble substances, burlap should be thoroughly rinsed in water before placing it on the concrete.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.

2.7 CONCRETE MIXTURES

- A. Proportion mixtures determined by either laboratory trial mix or field test data bases, as follows:
 - 1. Proportion normal-weight concrete according to ACI 211.1 and ACI 301.
 - 2. Provide different mixtures as the season warrants, as well as each type and strength of concrete or for different placing methods.
- B. Use a qualified independent testing agency for preparing and reporting proposed Mixture Proportions for the laboratory trial mix basis.
- C. Requirements for normal-weight concrete mix are shown on Drawings:
 - 1. Compressive strength
 - 2. Slump
 - 3. Water-cementitious materials ratio
 - 4. Air content

- D. Supplementary cementitious materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials according to ACI 318 requirements.
- E. Air Entrainment:
1. See General Notes on Drawings for total average air content (percent by volume).
 2. Average air content shall exceed value stated in General Notes on Drawings.
 3. Permissible variation for any one test result from specified average total air content: plus or minus 1.5 percent unless noted otherwise on General Notes on Drawings.
 4. Hardened concrete shall have an air void spacing factor of 0.0080 in. maximum. Specific surface (surface area of air voids) shall be 600 in² per cu in. of air-void volume, or greater. Concrete mixes not meeting these values as determined by ASTM C 457 may require adjustments unless accepted in writing by Engineer."
- F. Chloride Ion Content of Mixture:
1. Water soluble chloride ion content of concrete shall not exceed 0.06 percent by weight of cement for pre-stressed concrete and 0.15 percent for reinforced concrete. (ACI 318 Chapter 4 Table 4.4.1 "Maximum Chloride Ion Content for Corrosion Protection of Reinforcement") Testing procedure to determine chloride ion content shall conform to ASTM C 1218.
 2. Concrete chloride ion content shall be determined by Testing Agency prior to placement. Cast samples from current production of concrete mix proposed for superstructure.
 3. Concrete not meeting the requirements of paragraph "Water soluble chloride ion content of concrete..." above, shall contain appropriate amount of calcium nitrite. Concrete supplier shall provide laboratory test results showing the amount of excess chloride ion content in the concrete mixture contributed by the aggregates. For each pound of chloride ion in excess of the amount allowed, mix shall contain calcium nitrite (30 percent, plus or minus 2 percent, solids content) on one-to-one basis (one gallon of calcium nitrite for one lb. of excess chloride ion). Calcium nitrite used to offset chloride ions is in addition to calcium nitrite used as a corrosion inhibitor. Maximum of 1.5 lb. of chloride ion per cubic yard may be offset in this manner.
- G. Alkali-Aggregate Reactivity Resistance: Provide one of the following:
1. Total equivalent alkali content of mixture less than 5 lb. /cu. yd.
 2. ASTM C1293: Expansion less than 0.04 % after 1 year for each of the aggregates (both coarse and fine) in the proposed concrete mixture. This data shall be less than 1 year old.
 3. ASTM C1260 or AASHTO T303: Expansion less than 0.1 % after 14 days for each of the aggregates (both coarse and fine) in the proposed concrete mixture.
 4. ASTM C1567: Expansion less than 0.1 % after 14 days with each of the aggregates (both coarse and fine) and the supplementary cementing materials (both source and quantity) of the proposed concrete mixture design. Alternatively, if satisfactory ASTM C1260 or AASHTO T303 test results can be provided for one of the aggregates that are being used, ASTM C1567 testing does not need to be provided for that aggregate.

5. CE CRD-C662: Expansion less than 0.1 % after 28 days with the each of the aggregates (both coarse and fine), the supplementary cementing materials (both source and quantity) of the proposed concrete mixture design and the lithium admixture source and dosage level of the proposed mixture design. Alternatively, if satisfactory ASTM C1260 or AASHTO T303 test results can be provided for one of the aggregates that are being used, CRD-C662 testing does not need to be provided for that aggregate.
- H. Admixtures: Use admixtures according to manufacturer's written instructions.
1. Consider using water-reducing admixture or high-range water-reducing admixture (Superplasticizers), as required, for placement, workability, finishing and when required, increased flowability.
 2. Consider using water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 3. Use high range water-reducing admixture in pumped concrete, concrete for parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio of 0.45 or less. Use normal or mid-range water reducing admixture for concrete with water-cementitious materials ratio greater than 0.45.
 4. Use corrosion-inhibiting admixture in concrete mixes as indicated.
- I. Slump (ACI 301, Part 4 header "Slump"):
1. Maximum slump for concrete is indicated on Drawings. Where field conditions require slump to exceed that shown, increased slump shall be obtained by use of high range water reducers (superplasticizers) only, and Contractor shall obtain written acceptance from Engineer who may require an adjustment to mix.
 2. All concrete containing high-range water-reducing admixture (superplasticizer) shall have a verified initial slump of 2– 3 in. Final slump after the addition of the superplasticizer shall be 6–9 in. as required by the contractor to properly place the concrete. Before permission for plant addition of superplasticizer to be granted by Engineer, fulfill following requirements:
 - a. Submit letter from testing laboratory which developed original mixture proportions, for each super plasticized mixture, certifying volume of mix water which will produce specified slump and water/cement ratio, taking into account aggregate moisture content.
 - b. Submit plant computer printout of mixture ingredients for each truckload of super plasticized concrete with delivery of that truckload. Mix water volume greater than that certified shall be cause for concrete rejection.
 - c. Over-retarding or crusting of flatwork surface: cause for concrete rejection.
 - d. Segregation or rapid slump loss (superplasticizer life) due to incompatibility or under-dosing: cause for concrete rejection.
- J. Engineer's acceptance of mixture proportions shall not relieve Contractor from responsibility for any variation from requirements of Contract Documents unless Contractor has in writing called Engineer's attention to each such variation at time of submission and Engineer has given written approval of each such variation.

- K. Adjustment to Concrete Mixtures: Adjustments to mixture proportions may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mixture and strength results shall be submitted to and accepted by Engineer before using in work.

2.8 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94 and ASTM C 1116, and furnish batch plant-printed ticket information at delivery to site.
 - 1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
- B. Provide plant-printed batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mixture identification number, date, time of batching, mixing time, quantity and details of materials, amount of water introduced and water permitted by plant to be added, if any.
- C. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94. Mix concrete materials in appropriate drum-type batch machine mixer.
 - 1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least one and one-half minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
 - 2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).
 - 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mix type, mix time, quantity, and amount of water added. Record approximate location of final deposit in structure.

2.9 MATERIAL ACCESSORIES

- A. Extended Open Time Epoxy Bonding Agent: Three component, water based, epoxy modified portland cement bonding agent and corrosion inhibitor coating providing the recommended Manufacturer's open time in which to apply repair mortar. Product shall be capable of achieving bond strength of 2,700 psi per ASTM C 882.
 - 1. Acceptable materials for this Work are:
 - a. "Duralprep A.C." by The Euclid Chemical Company, Cleveland, OH.
 - b. "Sika Armatec 110 EpoCem", by Sika Corporation, Lyndhurst, NJ.
 - c.
- B. Epoxy Adhesive: 2 or 3 component, 100 percent solids, 100 percent reactive compound suitable for use on dry or damp surfaces. Product shall be capable of achieving bond strength of 1,800 psi per ASTM C 882.

1. Acceptable materials for this Work are:
 - a. "MasterEmaco P 124" or "MasterEmaco ADH 326," by BASF Corporation.
 - b. "Kemko 001 or 008", by ChemCo Systems, Inc., Redwood City, CA.
 - c. "Dural #452 and Dural Series", by The Euclid Chemical Company, Cleveland, OH.
 - d. Sikadur 32 Hi-Mod LPL", by Sika Corporation, Lyndhurst, NJ.
- C. Epoxy Coating for Existing Exposed Non-prestressed Steel Reinforcement or Welded Wire Reinforcement:
 1. Provide one of following epoxy coatings:
 - a. "Sikadur 32 Hi-Mod," Sika Chemical Corp.
 - b. "MasterEmaco ADH 326," BASF Corporation.
 - c. "Scotchkote 413 PC," 3M Company.
 - d. "Dural 452 MV," The Euclid Chemical Company.
 - e. "Resi-Bond (J-58)," Dayton Superior Corporation.
- D. For mechanical tension splices of reinforcement:
 1. All splices to develop 125 percent of specified yield strength of bars, or of smaller bar in transition splices. Acceptable products:
 - a. Bar-Lock Rebar Coupler, by Dayton Superior.
 - b. Bar-Grip or Grip-Twist, by Barsplice Products, Inc.
 - c. Extender HRC 500 Series Coupler, by Headed Reinforcement Corp.
 - d. Splice Sleeve, by NMB.
 - e. LENTON Splices, by Erico.
- E. Compression splices: Mechanically coupled splices in accordance with ACI 318, Chapter 12.

2.10 TOOLS

- A. Slab Jointing
 1. Concrete groovers: For tooled joints in concrete:
 - a. For concrete not exceeding 4 in. thickness, use groover with 1 in. deep v-cut bit, 0.5 in. surface width and 3/16 in. to 1/4 in. edge radius.
 - b. For concrete exceeding 4 in. thickness, use groover with 1.5 in. deep v-cut bit, 0.5 in. surface width and 3/16 in. to 1/4 in. edge radius.
 2. Saw Cut Joints:
 - a. Acceptable tool: "Soff-Cut Saw Model 310" or "Model G2000," Soff-Cut International, Corona, CA.

- 1) Cut joint as soon as concrete will support weight of operator and saw without deforming.
 - 2) Joint shall be 1 in. deep for concrete thickness of 4 in. or less. Joint shall be 1.5 in. deep for concrete exceeding 4 in. thickness. Do not cut reinforcement.
 - 3) Extend joint to adjacent vertical surface within 30 minutes of cutting.
 - 4) Retool or grind saw cut joint before installing sealant to provide equivalent dimensions, shape and volume as joint obtained by tooled joint. Surface width shall be 0.5 in. with 3/16 to 1/4 in. edge radius.
- B. All joints subject to acceptance by sealant installer. Concrete contractor to rework rejected joints until acceptable to sealant installer.

PART 3 - EXECUTION

3.1 PRECONSTRUCTION MEETING

- A. Conduct a preconstruction meeting addressing the concrete preparation, installation, protection, quality control, and acceptance of Work.

3.2 FORMWORK

- A. Design, construct, erect, shore, brace, and maintain formwork according to ACI 301 and ACI 347.

3.3 STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

3.4 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Locate and install so as not to impair strength or appearance of concrete, at locations indicated or as approved by Engineer.
- C. Isolation Joints: Install joint-filler strips at junctions with slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint filler full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.

3.5 CONCRETE PLACEMENT

- A. Comply with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.
- B. Do not add water to concrete during delivery, at Project site, or during placement.
- C. Consolidate concrete with mechanical vibrating equipment.
- D. Cold Weather Placement: Comply with ACI 306.1.
- E. Hot Weather Placement: Comply with ACI 305 R.

3.6 FINISHING FORMED SURFACE.

- A. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.7 FINISHING FLOORS AND SLABS

- A. Flatwork in Horizontal Areas (BROOM Finish, ACI 301, Section 5 header "Broom or Belt Finish":
 - 1. Bullfloat immediately after screeding. Complete before any excess moisture or bleed water is present on surface (ACI 302.1R, Article 8.3.3). The use of power trowels is discouraged; however, if they are used the following applies:
 - a. Use minimal passes so as to not overwork the concrete.
 - b. At the contractor's expense a petrographic analysis will be required in each area where a power trowel is used to verify the air content at the slab surface is within specified limits.
 - 2. After excess moisture or bleed water has disappeared and concrete has stiffened sufficiently to allow operation, give slab surfaces coarse transverse scored texture by drawing broom across surface. Texture shall be as accepted by Engineer from sample panels.
 - 3. Finish tolerance: ACI 301, Paragraph 5.3.4.2 and ACI 117, paragraph 4.5.7: The gap at any point between the straightedge and the floor (and between the high spots) shall not exceed 0.5 in. In addition, floor surface shall not vary more than plus or minus 0.75 in. from elevation noted on Drawings anywhere on floor surface.
 - 4. Before installation of flatwork and after submittal, review, and approval of concrete mixture proportions, Contractor shall fabricate two acceptable test panels simulating finishing techniques and final appearance to be expected and used on Project. Test panels shall be minimum of 4 ft. by 4 ft. in area and shall be reinforced and cast to thickness of typical parking and drive area wearing surface in Project. (Maximum thickness of test panels need not exceed 6 in.) Contractor shall finish panels following requirements of paragraphs above. Finished panels (one or both) may be rejected by Engineer, in which case Contractor shall repeat procedure on rejected panel(s) until Engineer acceptance is obtained. Accepted test panels

shall be cured in accordance with Specifications and may be incorporated into Project. Accepted test panels shall serve as basis for acceptance/rejection of final finished surfaces of all flatwork.

5. Finish all concrete slabs to proper elevations to ensure that all surface moisture will drain freely to floor drains, and that no puddle areas exist. Contractor shall bear cost of any corrections to provide for positive drainage.

B. Flatwork subject to pedestrian traffic:

1. Concrete surfaces at all walking areas subject to pedestrian traffic shall provide a smooth, slip resistant walking surface for pedestrians with these minimum requirements:
 - a. Shall provide walking surfaces in accordance with ASTM – F 1637 Standard Practice for Safe Walking Surfaces and “2010 ADA Standards for Accessible Design” and ICC A117.1.
 - b. Adjoining walkway surfaces shall be flush and meet the following minimum requirements:
 - 1) Changes in level of less than $\frac{1}{4}$ inch in height may be without edge treatment as shown in ADA Figure 303.2 and on the Drawings.
 - 2) Changes in Level between $\frac{1}{4}$ inch and $\frac{1}{2}$ inch height shall be beveled with a slope no greater than 1:2 as shown in ADA Figure 303.3 and on the Drawings.
 - 3) Changes in level greater than $\frac{1}{2}$ inch in height are not permitted unless they can be transitioned by means of a ramp with minimum requirements shown on the Drawings.
 - 4) Openings in floor or ground surfaces shall not allow passage of a sphere more than $\frac{1}{2}$ inch diameter except as allowed for elevators and platform lifts as shown in ADA Figure 302.3 and on the Drawings.
 - c. Walkway surfaces shall provide a slip resistant surface.
 - 1) Concrete surfaces shall be troweled and finished to provide a slip resistant finish.
 - 2) Contractor shall provide sample area with slip resistant surface finish.
 - 3) Static coefficient of friction for walking surfaces shall be measured on a dry surface by the NBS – Brungraber machine using a silastic sensor shoe and shall be 0.6 or larger for a level surface and 0.8 or larger for ramps.

3.8 TOLERANCES

- A. Comply with ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

3.9 CONCRETE PROTECTION AND CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305R for hot-weather protection during placement. Keep concrete continually moist prior to final curing by evaporation retarder, misting, sprinkling, or using absorptive mat or fabric covering kept continually moist.
- B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.1 lb/sq. ft. x h before and during finishing operations. Apply material according to manufacturer's written instructions one or more times after placement, screeding and bull floating concrete, but prior to float finishing. Repeated applications are prohibited after float finishing has begun.
 - 1. Acceptable evaporation retarder materials for this Work are:
 - a. "Cimfilm", by Axim Concrete Technologies.
 - b. "MasterKure ER 50," by BASF Corporation.
 - c. "AquaFilm", by Conspec Marketing & Manufacturing Co., Inc.
 - d. "Sure-Film (J-74)", by Dayton Superior Corporation.
 - e. "Eucobar", or "Tamms Surface Retarder", by The Euclid Chemical Company, Cleveland, OH.
 - f. "E-Con", by L&M Construction Chemicals, Inc.
 - g. "EVRT", by Russ Tech Admixtures, Inc.
 - h. "SikaFilm", by Sika Corporation, Lyndhurst, NJ.
- C. Immediate upon conclusion of finishing operation cure concrete in accordance with ACI 308 for duration of at least seven days by moisture curing or moisture retaining covering. Provide additional curing immediately following initial curing and before concrete has dried.
 - 1. Continue method used in initial curing.
 - 2. Material conforming to ASTM C171.
 - 3. Other moisture retaining covering as approved by Engineer/Architect.
 - 4. During initial and final curing periods maintain concrete above 50°.
 - 5. Prevent rapid drying at end of curing period.
- D. Concrete surfaces to receive slab coatings or penetrating sealers shall be cured with moisture curing or moisture-retaining cover. Concrete surfaces may be cured by sealer/coating manufacturer recommended dissipating resin curing compound, complying with ASTM C309 and in accordance with ACI 506.7.
- E. Dissipating Curing Compound [(VOC Compliant, less than 350 g/l)]: Comply with ASTM C 309, Type 1, Class A or B. Moisture loss shall be not more than 0.55 kg/m² when applied at 200 sq. ft/gal. Manufacturer's certification is required. Silicate based compounds are prohibited.
 - 1. Subject to project requirements provide one of the following products:
 - a. "Kurez DR VOX" or "Kurez RC," or "Kurez RC Off," The Euclid Chemical Company.

- b. "RxCure WB," or "RxCure VOC" or "W.B. Cure VOC," Conspec Marketing & Manufacturing.
 - c. "MasterKure CC 200 WB" or "MasterKure CC 160 WB," BASF Corporation.
 - 2. Additional requirements:
 - a. With product submittal provide plan and procedures for removal of residual curing compound prior to application of sealers, coatings, stains, pavement markings and other finishes.
 - b. Provide a summary of testing to show adequate surface preparation for successful application of sealers, coatings, stains, pavement markings, and other finishes.
- F. Curing Methods: Cure formed and non-formed concrete moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
- 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 - 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner shall engage a qualified independent testing and inspecting agency acceptable to the Engineer to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article. Perform tests according to ACI 301.
- B. Sample concrete in accordance with ASTM C 172.
- C. Epoxy Coated Material:
 - 1. Perform field inspection of installed epoxy coated material under provisions of Division 01 Section "Quality Control."
 - 2. Repair all epoxy coating damage due to fabrication and handling, using a mirror to find any damage on undersides.

3. Repair all damaged areas using manufacturer's recommended patching material and method.
4. No damaged area shall be left uncorrected.
5. Epoxy coated welded wire reinforcement with consistent visible holes in epoxy coating (particularly at mesh intersections): unacceptable. Remove from project.

D. Temperature:

1. Test temperature of concrete in accordance with ASTM C 1064/C 1064M and ACI 301 each time cylinders are taken or as directed by the Engineer.

E. Slump Test:

1. Conduct one slump test in accordance with ASTM C 143/C 143M per truck load of ready-mixed concrete delivered to Project at truck for superstructure concrete.
2. Conduct slump test in accordance with ASTM C143/C 143M and ACI 301 for foundation concrete.
3. When high-range water-reducing admixture (superplasticizer) is used, initial slump must be verified by Testing Agency.
4. General Contractor: Coordinate all parties involved to produce conforming concrete.
5. Sample freshly-mixed concrete at point of final placement in accordance with ASTM C 172 and conduct one air content test in accordance with ASTM C 231 or ASTM C 173 for each truck of ready-mix, air entrained concrete delivered to Project.

F. Concrete Compressive Strength:

1. Make test cylinders in accordance with ASTM C 31 and test in accordance with ASTM C 39 as follows:
 - a. Take minimum of three sets of cylinders for each 100 cu yds. or fraction thereof, of each Mixture of concrete placed in any one day.
 - b. A set of cylinders shall be comprised of two 6 inch by 12 inch cylinders or three 4 inch by 8 inch cylinders.
 - c. At Contractor's option and cost, cylinders may be taken to verify concrete strength prior to form removal.
 - d. Testing Agency: Provide and maintain site cure box for cylinders.
2. Sample plastic concrete for testing at point of final placement, in accordance with ASTM C 172. Engineer will select sampling locations which may include points where plastic concrete has already been screeded and floated.
3. Cover specimens properly, immediately after finishing. Protect outside surfaces of cardboard molds, if used, from contact with sources of water for first 24 hours after molding.
4. Cure test cylinders per ASTM C 31 as follows:
 - a. To verify compressive strength prior to form removal or for additional test cylinders required due to cold weather concreting conditions:

- 1) Store test specimens on structure as near to point of sampling as possible and protect from elements in same manner as that given to portion of structure as specimen represents.
 - 2) Transport to test laboratory no more than 4 hours before testing. Remove molds from specimens immediately before testing.
 - b. To verify 28-day compressive strength:
 - 1) During first 24 hours after molding, store test specimens under conditions that maintain temperature immediately adjacent to specimens in range of 60 to 80 degrees F. and prevent loss of moisture from specimens.
 - 2) Remove test specimens from molds at end of 20 +/- 4 hours and store in moist condition at 73.4 +/- 3 degrees F. until moment of test. Laboratory moist rooms shall meet requirements of ASTM C 511.
5. Compression test for non-prestressed concrete:
 - a. Test one set of cylinders at 7 days.
 - b. Test one set of cylinders at 28 days.
 - c. Test one set of cylinders at 56 days for concrete strength requirement of 7000 psi or greater.
6. Compression tests for post-tensioned concrete:
 - a. Test one set of cylinders immediately before tensioning slabs and beams. Cylinders must be field cured in accordance with paragraph "Cure test cylinders per ASTM C 31...."
 - b. Test one set of cylinders at 28 days.
7. Hold one set of cylinders in reserve for use as Engineer directs.
8. Unless notified by Engineer, reserve cylinders may be discarded without being tested after 56 days.
- G. Report all nonconforming test results to Engineer and others on distribution lists via fax or email. Follow up with colored paper copies to flag the non-conformances.
- H. Monthly, submit a graph showing distribution of compressive strength test results and air content test results. Include microwave test results for concretes with a water cementitious ratio less than or equal to 0.40 concrete.

3.11 EVALUATION AND ACCEPTANCE OF WORK

- A. Acceptance of Repairs (ACI 301):
 1. Acceptance of completed concrete Work will be according to provisions of ACI 301.
 2. Repair areas shall be sounded by Engineer and Contractor with hammer or rod after curing for 72 hours. Contractor shall repair all hollowness detected by removing and replacing patch or affected area at no extra cost to Owner.

3. If shrinkage cracks appear in repair area when initial curing period is completed, repair shall be considered defective, and it shall be removed and replaced by Contractor at no extra cost.

3.12 CONCRETE MIX DESIGN FORM

- A. See appendix to this Section for concrete mix design form.

END OF SECTION 03 30 21

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APPENDIX: Concrete Mix Design Submittal Form

I. <u>GENERAL INFORMATION</u>	
Project:	City:
General Contractor:	
Concrete Supplier:	
Mixture Identification No.:	Concrete Grade:
Use (Describe) ¹ :	

¹ example: floor slabs, topping, columns, etc.

II. <u>MIXTURE PROPORTIONING DATA</u>		
Proportioning Based on (Check only one):		
Standard Deviation Analysis: _____		
or Trial Mix Test Data: _____		
Mixture Characteristics: (see Mixtures in Drawings General Notes)	Density: _____ pcf;	Air: _____ % specified
	Slump _____ in. before superplasticizer	Slump _____ in. after superplasticizer Or for SCC: Spread _____ in.
	Strength: _____ psi (28 day);	

WALKER SUBMITTAL STAMP
CONTRACTOR SUBMITTAL STAMP

III. <u>MATERIALS</u>		
Aggregates: (size; type; source; gradation report; specification)		
Coarse:		
Fine:		
Other Materials:	<u>Type</u>	<u>Product-Manufacturer (Source)</u>
Cement:		
Flyash, slag, or other pozzolan:		
Silica Fume		
Processed Ultra Fine Fly Ash		
HRM		
Air Entraining Agent:		
Water Reducer		
High Range Water Reducer (HRWR / superplasticizer)		
Non-Corrosive Accelerator		
Retarder		
Fibers		
Other(s):		

IV. <u>MIX PROPORTIONS</u> ⁽²⁾		
	WEIGHT (lbs.) (per yd ³)	ABSOLUTE VOL. (cu. ft.) (per yd ³)
Cement:		
Fine Aggregate: ⁽³⁾		
Coarse Aggregate: ⁽³⁾		
Flyash, slag, or other pozzolan:		
Silica Fume		
Processes Ultra-Fine Fly Ash		
HRM		
Water: ⁽⁴⁾ (gals. & lbs.)		
Entrained Air: (oz.)		
Fibers:		
(Other) _____:		

TOTALS:		
NOTES:		
⁽²⁾ Mix proportions indicated shall be based on data used in section VII or IX.		
⁽³⁾ Based on saturated surface dry weights of aggregates.		
⁽⁴⁾ Includes ALL WATER, including added water and free water contained on aggregates.		

V. RATIOS		VI. SPECIFIC GRAVITIES	
Water ⁽¹⁾	lb.	Fine Aggregate:	
=	=		
Cementitious Material ⁽²⁾	lb.	Coarse Aggregate:	
=	=		
Fine Agg.	lb.		
=	=		
Total Agg.	lb.		
NOTES: ⁽¹⁾ Includes ALL water, including added water and free water contained on aggregates. ⁽²⁾ Cementitious materials include cement, fly ash, slag, silica fume, HRM, Processed Ultra-Fine Fly Ash or other pozzolan.			

VII. ADMIXTURES					
Air Entraining Agent (A.E.A.):	___ oz.	per yd ³	___ oz.	per 100# cement	
Superplasticizer	___ oz.	per yd ³	___ oz.	per 100# cement	
Water Reducer	___ oz.	per yd ³	___ oz.	per 100# cement	
Non-corrosive Accelerator	___ oz.	per yd ³	___ oz.	per 100# cement	
Retarder	___ oz.	per yd ³	___ oz.	per 100# cement	
Other	___ oz.	per yd ³	___ oz.	per 100# cement	
Lithium Nitrate	___ gal.	per yd ³			

VIII. <u>STANDARD DEVIATION ANALYSIS:</u>		<u>Yes</u>	<u>N/A</u>
(Complete this section only if Mixture was developed using standard deviation analysis of previous project test results. If other method was used, check "N/A".)			
<u>Number of Tests Evaluated:</u> (One test is average of two cylinder breaks)		<u>Standard Deviation:</u> (Single Group)	
<u>Attach copy of test data considered:</u>		<u>Standard Deviation:</u> (Two Groups)	
Required average compressive strength: $f'_{cr} = f'_c + \underline{\hspace{2cm}}$ psi			
<p>NOTE:</p> <p>Mixture shall be proportioned in accordance with ACI 301 section 4.2.3 to achieve average compressive strength f'_{cr} equal to or greater than the larger of one of the following equations:</p> <p>(4.-3) $f'_{cr} = f'_c + 1.34ks$ [s= calculated standard deviation] or (4-4) $f'_{cr} = f'_c + 2.33ks - 500$ or (4-5) $f'_{cr} = 0.9f'_c + 2.33ks$ (for $f'_c > 5,000$ psi)</p> <p>(Refer to ACI 301 for required average when data are not available to establish standard deviation. For post-tensioning projects, see also special requirements for strength required to apply initial post-tensioning.)</p>			
MIXTURE CHARACTERISTICS (As shown on drawings)			
Slump = <u> </u> in.		Air Content = <u> </u> %	
Unit Wet Wt. = <u> </u> pcf		Unit Dry Wt. = <u> </u> pcf	
MIXTURE CHARACTERISTICS (Based on proportioning data)			
Initial Slump = <u> </u> in.		Final Slump <u> </u> in.	
Unit Wet Wt.= <u> </u> pcf.		Unit Dry Wt. = <u> </u> pcf.	
Air Content = <u> </u> %			

IX. <u>TRIAL MIXTURE TEST DATA:</u>		<u>Yes</u>	<u>N/A</u>
(Complete this section only if Mixture Proportion is based on data from trial test mixture(s) batched by testing agency or Contractor. If other method was used, check "N/A".)			
<u>Age</u> (days)	<u>Mix #1</u> (comp. str.)	<u>Mix #2</u> (comp. str.)	<u>Mix #3</u> (comp. str.)
<u>7</u>			
<u>7</u>			
<u>28</u>			
<u>28</u>			
<u>28</u>			
<u>28</u> day average compressive strength, psi			
<p>NOTE:</p> <p>Mixture shall be proportioned in accordance with ACI 301 section 4.2.3 to achieve average compressive strength f'_{cr} equal to or greater than the larger of one of the following equations:</p> <p>(Less than 3000) $f'_{cr} = f'_c + 1000$ or (3000 to 5000) $f'_{cr} = f'_c + 1200$ or (Over 5000) $f'_{cr} = 1.1f'_c + 700$</p> <p>For post-tensioning projects, see also special requirements for strength required to apply initial post-tensioning.</p>			
MIXTURE CHARACTERISTICS (as shown on drawings)			
Slump = _____ in.		Air Content = _____ %	
Unit Wet Wt. = _____ pcf		Unit Dry Wt. = _____ pcf	
MIXTURE CHARACTERISTICS (Based on proportioning data)			
Initial Slump = _____ in.		Final Slump _____ in.	
Unit Wet Wt.= _____ pcf.		Unit Dry Wt. = _____ pcf.	
Air Content = _____ %			

<u>X. OTHER TEST DATA</u>		
Water Soluble Chloride Ion Content of mix:	_____ % (by weight of cement)	ASTM C 1218
Hardened Air Content (per ASTM C457):		
Air content: _____%	Air void spacing Factor _____ in.	Specific surface: _____ in ² /in ³
Chloride Ion Content of Concrete Mixture: ASTM C 1218		
Shrinkage (Length Change, Average) per ASTM C157:		
_____ % @ 4 days	_____ % @ 7 days	_____ % @ 14 days
_____ % @ 21 days	_____ % @ 28 days	

<u>XI. Remarks:</u>

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Ready Mix Concrete Supplier Information
Name:
Address:
Phone Number:
Date:
Main Plant Location:
Miles from Project Site:
Secondary or Backup Plant Location:
Miles from Project Site:

My signature below certifies that I have read, understood, and will comply with the requirements of this Section.

Signature _____

Typed or Printed Name _____

REQUIRED ATTACHMENTS	
	Coarse aggregate grading report
	Fine aggregate grading report
	Concrete compressive strength data used for calculation of required average strength and for calculation of standard deviation
	Chloride ion data and related calculations
	Admixture compatibility certification letter
	Shrinkage information per ASTM C157
	ASTM C 457
	Alkali Content Data and Calculations OR ASTM C1293, ASTM C1260, ASTM C 1567 or CE CRD-C662 Test report for each aggregate

SECTION 03 37 60 – PREPACKAGED REPAIR MORTAR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the provision of all labor, materials, supervision and incidentals necessary to prepare deteriorated or damaged concrete surfaces and install prepackaged concrete repair mortar to formed horizontal, vertical and overhead surfaces to restore original surface condition and integrity.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 01 Section "Submittal Procedures."
 - 2. Division 02 Section "Work Items."
 - 3. Division 02 Section "General Concrete Surface Preparation."
 - 4. Division 02 Section "Surface Preparation for Patching and Overlay."
 - 5. Division 03 Section "Cast-In-Place Concrete - Restoration."
 - 6. Division 07 Section "Concrete Joint Sealants."
 - 7. Division 07 Section "Traffic Coatings."
 - 8. Division 09 Section "Pavement Marking."

1.3 QUALITY ASSURANCE

- A. Work shall conform to requirements of ACI 301 as applicable except where more stringent requirements are shown on Drawings or specified in this Section.
- B. Testing Agency:
 - 1. Independent testing laboratory employed by Owner and acceptable to Engineer.
 - 2. Accredited by AASHTO under ASTM C1077. Testing laboratory shall submit documented proof of ability to perform required tests.
- C. Sampling and testing of mortar shall be performed by ACI certified Concrete Field Technicians Grade I. Certification shall be no more than three years old.
- D. Testing Agency is responsible for conducting, monitoring and reporting results of all tests required under this Section. Testing Agency has authority to reject mortar not meeting Specifications. Testing Agency does not have the authority to accept mortar that does not meet specifications.

- E. Testing Agency shall submit the following information for Field Testing of Concrete unless modified in writing by Engineer:
1. Project name and location.
 2. Contractor's name.
 3. Testing Agency's name, address and phone number.
 4. Mortar manufacturer.
 5. Date of report.
 6. Testing Agency technician's name (sampling and testing).
 7. Placement location within structure.
 8. Weather data:
 - a. Air temperatures.
 - b. Weather.
 - c. Wind speed.
 9. Date, time, and place of test.
 10. Compressive test data:
 - a. Cube or cylinder number.
 - b. Age of sample when tested.
 - c. Date and time of test.
 - d. Compressive strength.

1.4 REFERENCES

- A. "Standard Specification for Structural Concrete" (ACI 301) by American Concrete Institute, herein referred to as ACI 301, is included in total as specification for this structure except as otherwise specified herein.
- B. Comply with provisions of following codes, specifications and standards except where more stringent requirements are shown on Drawings or specified herein:
1. "Building Code Requirements for Structural Concrete" (ACI 318), American Concrete Institute, herein referred to as ACI 318.
 2. "Specification for Hot Weather Concreting," ACI 305.1.
 3. "Standard Specification for Cold Weather Concreting," ACI 306.1.
 4. "Standard Specification for Curing Concrete" (ACI 308.1)
- C. Contractor shall have following ACI publications at Project construction site at all times:
1. "Standard Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References," ACI Field Reference Manual, SP15.
 2. "Specification for Hot Weather Concreting," ACI 305.1.
 3. "Standard Specification for Cold Weather Concreting," ACI 306.1.
- D. ASTM International (ASTM):
1. ASTM C109, "Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)."

2. ASTM C31, "Test Method for Compressive Strength of Cylindrical Concrete Specimens."
3. ASTM C1583, "Standard Test Method for the Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)"

1.5 SUBMITTALS

- A. Make submittals in accordance with requirements of Division 01 and as specified in this Section.
- B. Contractor: At preconstruction meeting, submit procedures for demolition, surface preparation, material batching, placement, finishing, and curing of application. Provide procedure to protect fresh patches from severe weather conditions.
- C. Testing Agency: Promptly report all mortar test results to Engineer and Contractor. Include following information:
 1. See Article "Quality Assurance," paragraph "Testing Agency shall submit...."
 2. Strength determined in accordance with ASTM C109.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of following, only where specifically named in product category:
 1. BASF Building Systems (BASF), Shakopee, MN
 2. Euclid Chemical Corporation (Euclid), Cleveland, OH
 3. King Construction Products (King), Burlington, ON
 4. Mapei Corporation (MAPEI), Deerfield Beach, FL
 5. Sika Corporation (Sika), Lyndhurst, NJ.

2.2 MATERIALS

- A. Horizontal Repair and Form and Pour Mortar: Shall be prepackaged cementitious repair mortar capable of horizontal and form and pour partial depth applications, achieving a minimum 3,000 psi compressive strength at 7 days and 5,000 psi compressive strength at 28 days per ASTM C39 as certified by manufacturer with maximum lineal shrinkage of 0.10% at 28 days. Extend per manufacturer's instructions as required for deeper placements.
 1. Acceptable polymer modified materials for this Work are as follows:
 - a. "MasterEmaco T310 CI" by BASF Corporation.
 - b. "Sika Repair 222 with Latex R," "SikaTop 111 Plus
 - c. "Duraltop" by Euclid

- d. Other types may be used only with Engineer/Architect's approval in writing prior to bidding.
- B. Horizontal Repair and Form and Pour Mortar for use with Galvanic Anodes: Shall be prepackaged cementitious repair mortar capable of horizontal and form and pour partial depth applications, achieving a minimum 3,000 psi compressive strength at 7 days and 5,000 psi compressive strength at 28 days per ASTM C39 as certified by manufacturer with maximum lineal shrinkage of 0.10% at 28 days.. Manufacturer shall provide written certification of compatibility with galvanic anode corrosion protection system. Extend per manufacturer's instructions as required for deeper placements.
1. Acceptable materials for this Work are as follows:
 - a. "MasterEmaco S440," by BASF Corporation.
 - b. "EucoRepair CP," by Euclid.
 - c. "FA-S10 Concrete," by King.
 - d. "Sikacrete 211," by Sika.
 - e. Other types may be used only with Engineer's approval in writing prior to bidding.
- C. Rapid Strength Repair Mortar: Shall be prepackaged, cementitious repair mortar. Repair mortar shall be capable of application achieving a minimum 3,500 psi compressive strength at 1 day and 5,000 psi compressive strength at 28 days per ASTM C39 as certified by manufacturer. Extend per manufacturer's instructions as required for deeper placements.
1. Acceptable materials for this Work are as follows:
 - a. "MasterEmaco T430," by BASF Corporation.
 - b. "Speedcrete 2028," by Euclid.
 - c. "HP-S10 Concrete," by King.
 - d. "Planitop 18 ES" by MAPEI.
 - e. "Sikaquick 1000," by Sika.
 - f. Other types may be used only with Engineer's approval in writing prior to bidding.
- D. Trowel Applied Repair Mortar: Shall be prepackaged, cementitious repair mortar capable of vertical/overhead application by trowel achieving a minimum 3,000 psi compressive strength at 7 days and 4,500 psi compressive strength at 28 days per ASTM C 109 as certified by manufacturer.
1. Acceptable polymer modified materials for this Work are as follows:
 - a. "MasterEmaco N 400 RS," "MasterEmaco N 400," "MasterEmaco N 426," or "MasterEmaco N 300 CI" by.
 - b. "Verticoat," "Speedcrete PM," or "Duraltop Gel" by The Euclid.
 - c. "SikaRepair 223 with Latex R", "SikaRepair SHB with Latex R", or "SikaRepair SHA with Latex R," by.
 - d. "Super-Top OV" by King

- e. Other types may be used only with Engineer's approval in writing prior to bidding.
- E. Horizontal Topping Mortar: Shall be prepackaged cementitious repair mortar capable of horizontal partial depth applications on minimum thickness of 0.5 inches and a maximum thickness of 2 inches, achieving a minimum 3,000 psi compressive strength at 7 days and 5,000 psi compressive strength at 28 days per ASTM C109 as certified by manufacturer. The mortar is not to be extended.
 - 1. Acceptable materials for this Work are as follows:
 - a. "MasterEmaco T1061," by BASF.
 - b. "Concrete Top Supreme," by Euclid.
 - c. "Duro-crete," by King.
 - d. "Planitop 15," by MAPEI.
 - e. "SikaTop 111 Plus," by Sika.
 - f. Other types may be used only with Engineer's approval in writing prior to bidding.

2.3 MATERIAL ACCESSORIES

- A. Extended Open Time Epoxy Bonding Agent: Three component, water based, epoxy modified portland cement bonding agent and corrosion inhibitor coating providing the recommended Manufacturer's open time in which to apply repair mortar.
 - 1. Acceptable materials for this Work are:
 - a. "MasterEmaco P124," by BASF.
 - b. "Duralprep A.C.," by Euclid.
 - c. "Planibond 3C," by MAPEI.
 - d. "Armatec 110 EpoCem", by Sika.
 - e. "B-1 Rebar Coating," by Tames.
- B. Bonding Grout: Bonding grout shall consist of prepackage repair material mixed with sufficient water to form stiff slurry to achieve consistency of "pancake batter."
- C. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
- D. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Epoxy Bonding Agent Extended Open Time:
 - 1. In strict accordance with manufacturer's recommendations, mix and apply epoxy bonding agent to all areas as indicated on Drawings.

2. Allow epoxy bonding agent to dry a minimum 2 hours, but no more than the Manufacturer's recommended open time prior to placing repair mortar.
- B. Bonding Grout:
1. Mix bonding grout and scrub into SSD repair substrate with a stiff broom to all areas as indicated on Drawings.
 2. Place repair material prior to initial set of grout. If grout sets prior to placement of repair material, completely remove grout from surface and re-clean prior to proceeding with new grout placement and repair mortar.
- C. Mortar Placement: Mortar materials shall be placed in strict accordance with manufacturer's instructions. Properly proportioned and mixed mortar material shall be placed using tools to consolidate mortar so that no voids exist within new material and continuous contact with base concrete is achieved.
- D. Form and Pour Repair Mortar Placement: Mix and apply in strict accordance with manufacturer's written instructions, to achieve a maximum 9" slump. Consolidate mortar so that no voids exist and continuous contact with base concrete is achieved.
- E. Vertical and Overhead Repairs: Mortar materials shall be placed in strict accordance with manufacturer's instructions. Properly proportioned and mixed mortar material shall be placed using tools to consolidate mortar so that no voids exist within new material and continuous contact with base concrete is achieved. Supplemental wire mesh shall be required for delamination and spall repairs greater than two inches in depth. **Fresh bonding grout is required between successive lifts of patching material.**
- F. Finishing:
1. Apply a nonslip broom finish to top of floor patches and to exterior concrete platforms, steps, and ramps. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.
 2. Provide a surface finish similar to adjacent surfaces for vertical and overhead partial depth repairs.
 3. Finish formed surfaces similar to adjacent surfaces.

3.2 CONCRETE PROTECTION AND CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 305R for hot-weather protection during placement. Keep concrete continually moist prior to final curing by evaporation retarder, misting, sprinkling, or using absorptive mat or fabric covering kept continually moist.
- B. Immediate upon conclusion of finishing operation cure concrete in accordance with ACI 308.1 for duration of at least three days by curing methods listed below. Provide additional curing immediately following initial curing and before concrete has dried.
1. During initial and final curing periods maintain concrete above 50°.

2. Prevent rapid drying at end of curing period.
- C. Concrete surfaces to receive slab coatings or penetrating sealers shall be cured with moisture curing or moisture-retaining-cover curing.
- D. Curing Methods: Cure formed and non-formed concrete moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
 - a. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Owner shall engage a qualified independent testing and inspecting agency acceptable to the Engineer to sample materials, perform tests, and submit test reports during concrete placement according to requirements specified in this Article. Perform tests according to ACI 301.
- B. Testing Frequency: Perform one set of strength testing and one bond test for each product used for each day's work. Prepare samples in accordance with ASTM C31.
- C. Compressive Strength Testing: Determine strength at 3, 7, and 28 days. Each test shall consist of two 6-inch diameter cylinders or three 4-inch diameter cylinders. Testing shall be in accordance with ASTM C39.
- D. Bond Testing: Bond testing shall be performed at 7 days in accordance with ASTM C1583.

3.4 EVALUATION AND ACCEPTANCE OF WORK

- A. Acceptance of Repairs (ACI 301):
 1. Acceptance of completed concrete Work will be according to provisions of ACI 301.
 2. Repair areas shall be sounded by Engineer and Contractor with hammer or rod after curing for 72 hours. Contractor shall repair all hollowness detected by removing and replacing patch or affected area at no extra cost to Owner.
 3. If shrinkage cracks appear in repair area when initial curing period is completed, repair shall be considered defective, and it shall be removed and replaced by Contractor at no extra cost.

4. Patches shall be considered defective if average strength does not meet minimum strength at 28 days or if average bond strength does not meet minimum requirements of 150 psi.

END OF SECTION 03 37 60

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SECTION 04 20 10 – UNIT MASONRY - SMALL PROJECTS

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

- A. Furnish face brick under the Face Brick Allowance specified in Division 01 Section "Summary of Work."
- B. Submit samples for face brick and hollow brick.
- C. Comply with ACI 530.1/ASCE 6/TMS 602.
- D. Construct a sample wall panel approximately 48 inches (1200 mm) long by 48 inches (1200 mm) high to demonstrate aesthetic effects and qualities of materials and execution.

PART 2 - PRODUCTS

2.1 MASONRY UNITS

- A. Concrete Masonry Units: ASTM C 90; Weight Classification, Normal Weight; Type, II, nonmoisture-controlled units.
 - 1. Special shapes for lintels, corners, jambs, sash, control joints, and other special conditions.
 - 2. Square-edged units for outside corners, unless otherwise indicated.
 - 3. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2000 psi.
 - 4. Size (Width): Manufactured to dimensions 3/8 inch less-than-nominal dimensions.
- B. Face Brick: ASTM C 216, Grade SW, Type FBS.
 - 1. Size: Match existing face brick units.
 - 2. Solid brick with exposed surfaces finished for ends of sills and caps.
 - 3. Special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.
 - 4. Color: Match existing face brick units
- C. Hollow Brick: ASTM C 652, Grade SW, Class H40V Type HBS, and compressive strength of 3000 psi.
 - 1. Size: Match existing face brick units.

2. Special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Solid brick with exposed surfaces finished for ends of sills and caps.
4. Color: Match existing face brick units

2.2 MORTAR

- A. Mortar: ASTM C 270, Proportion Specification [ASTM C 270, Proportion Specification, for job-mixed mortar; and ASTM C 1142 for ready-mixed mortar U.B.C. Standard 21-15, Proportion Specification.
 1. Masonry Cement:
 2. Do not use calcium chloride in mortar.
 3. For masonry below grade, in contact with earth, reinforced masonry, and where indicated, use Type S.
 4. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions, and for other applications where another type is not indicated, use Type N or RN.
 5. For face brick, or hollow brick, use colored cement or cement-lime mix to match existing color.
- B. CMU grout: Comply with ASTM C 476.
 1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
 2. Proportion grout in accordance with ASTM C 476, and Contract Drawings for specified 28-day compressive strength indicated, but not less than 3000 psi.
 3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.
- C. Application: Use epoxy pointing mortar for exposed mortar joints with pre-faced CUMs.

2.3 JOINT REINFORCEMENT, TIES, AND ANCHORS

- A. Provide joint reinforcement formed from galvanized carbon-steel wire conforming to ASTM A 951/A 951M.
 1. Interior Walls: Hot-dip galvanized carbon steel with ASTM A 153/A 153M, Class B-2 coating.
 2. Exterior Walls: Hot-dip galvanized carbon steel with ASTM A 153/A 153M, Class B-2 coating
 3. Wire Diameter for Side Rods: **0.1483** inch.
 4. Wire Diameter for Cross Rods: 0.1483 inch
 5. For single-wythe masonry, provide truss design.
 6. For multi-wythe masonry, provide truss design with 3 side rods
 7. Veneer Anchors: 2-piece adjustable masonry veneer anchors allowing vertical or horizontal differential movement between veneer and wall framing parallel to plane of wall but resisting tension and compression forces perpendicular to it, for

attachment over sheathing to studs, and acceptable to authorities having jurisdiction.

- B. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.4 mm) thick by 24 inches (600 mm) long, with ends turned up 2 inches (50 mm) or with cross pins.

2.4 EMBEDDED FLASHING MATERIALS

- A. Through-Wall, Ribbed, Sheet Metal Flashing: Manufacture through-wall sheet metal flashing for embedment in masonry, with ribs at 3-inch intervals along length of flashing to provide integral mortar bond.
 - 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:
 - 1) Cheney Flashing Company.
 - 2) Hohmann & Barnard, Inc.
 - 3) Keystone Flashing Company, Inc.
 - 4) Sandell Manufacturing Co., Inc.
- B. Sheet Metal Flashing: Stainless-steel, 0.016 inch or 0.0135 inch thick for fully concealed flashing, 16-oz./sq. ft. weight or 0.0216 inch thick elsewhere. Mill finish
- C. Laminated Flashing 5 oz./sq. ft. copper sheet bonded with asphalt between 2 layers of glass-fiber cloth.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

2.5 MISCELLANEOUS MASONRY ACCESSORIES.

- A. Weep Holes: Round polyethylene tubing, 3/8-inch
- B. Loose-Granular Perlite Insulation: ASTM C 549, Type II or IV.
- C. Extruded-Polystyrene Board Insulation: ASTM C 578, Type IV.
- D. Polyisocyanurate Board Insulation: FS HH-I-1972/1, Class 2.
- E. Masonry Cleaner: 1/2-cup tetrasodium polyphosphate and 1/2-cup laundry detergent dissolved in 1 gal. of water.

2.6 REINFORCEMENT

- A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60

- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars 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. Dur-O-Wal; a Hohmann & Barnard company.
 - b. Heckmann Building Products, Inc.
 - c. Hohmann & Barnard, Inc.
 - d. Wire-Bond

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cut masonry units with motor-driven saws. Install cut units with cut surfaces and, where possible, cut edges concealed.
- B. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
- C. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
- D. Stopping and Resuming Work: In each course, rack back units; do not tooth.
- E. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.
- F. Build non-load-bearing interior partitions full height and install compressible filler in joint between top of partition and underside of structure above.
- G. Tool exposed joints slightly concave when thumbprint hard, unless otherwise indicated.
- H. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.

3.2 MASONRY JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
 - 1. Space reinforcement not more than 16 inches o.c.

2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
 3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions

3.3 LINTELS

- A. Install steel lintels where indicated.
- B. Masonry lintels where shown. Precast lintels made from concrete matching concrete masonry units in color, texture, and compressive strength and with reinforcement bars indicated or required to support loads indicated.
- C. Minimum bearing of 8 inches (200 mm) at each jamb, unless otherwise indicated.

3.4 FLASHING AND WEEP HOLES

- A. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
- B. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing before covering with mortar.
1. Extend flashing 4 inches (100 mm) into masonry at each end and turn up 2 inches (50 mm) to form a pan.
- C. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified independent testing agency to perform the following tests for each 5000 sq. ft. (460 sq. m) of wall area or portion thereof.
1. Mortar Properties: ASTM C 270.
 2. Mortar Composition and Properties: ASTM C 780.
 3. Grout: ASTM C 1019.

3.6 PARGING

- A. Parge predampened masonry walls, where indicated, with Type S or Type N mortar applied in 2 uniform coats with a steel-trowel finish. Form a wash at top of parging and a cove at bottom. Damp cure parging for at least 24 hours.

3.7 CLEANING

- A. Clean stone masonry veneer as work progresses. Remove mortar fins and smears before tooling joints.
- B. Final Cleaning: After mortar is thoroughly set and cured, remove large mortar particles and scrub unit masonry.
 - 1. Wet wall surfaces with water, apply cleaner, then remove cleaner by rinsing thoroughly with clear water.

END OF SECTION 04 20 10

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SECTION 04 72 00 - CAST STONE MASONRY

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. Cast stone including the following:]
 - a. Coping.
 - b. Wall caps.
- B. Related Sections:
 - 1. Division 04, Section "Unit Masonry" for installing cast stone units in unit masonry.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
 - 1. For precast stone units, include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages if any, and indication of finished faces.
 - 1. Include building elevations showing layout of units and locations of joints and anchors.
- C. Samples for Initial Selection: For colored mortar.
- D. Samples for Verification:
 - 1. For color and texture of cast stone required, 10 inches square in size.
 - 2. For colored mortar. Make Samples using same sand and mortar ingredients to be used on Project.]

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For manufacturer and testing agency.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Architectural Precast Association.
- B. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Coordinate delivery of cast stone with unit masonry work]to avoid delaying the Work and to minimize the need for on-site storage.
- B. Pack, handle, and ship cast stone units in suitable packs or pallets.
 - 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
 - 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

PART 2 - PRODUCTS

2.1 CAST STONE MATERIALS

- A. Portland Cement: ASTM C 150, Type I or Type III, containing not more than 0.60 percent total alkali when tested according to ASTM C 114. Provide natural color or white cement as required to produce cast stone color indicated.
- B. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation and colors as needed to produce required cast stone textures and colors.
- C. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to produce required cast stone textures and colors.
- D. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

- E. Admixtures: Use only admixtures specified or approved in writing by Architect.
 - 1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - 2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 - 3. Air-Entraining Admixture: ASTM C 260. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
- F. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M, Grade 60 . Use galvanized when covered with less than 1-1/2 inches of cast stone material.
 - 1. Galvanized Coating: ASTM A 767/A 767M.
- G. Embedded Anchors and Other Inserts: Fabricated from steel complying with ASTM A 36/A 36M, and hot-dip galvanized to comply with ASTM A 123/A 123M.

2.2 CAST STONE UNITS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work.
- B. Provide cast stone units complying with ASTM C 1364 using either the vibrant dry tamp or wet-cast method.
- C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.
 - 1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
 - 2. Provide drips on projecting elements unless otherwise indicated.
- D. Fabrication Tolerances:
 - 1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch.
 - 2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch, whichever is greater, but in no case by more than 1/4 inch.
 - 3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch, whichever is greater.
 - 4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch (3 mm) on formed surfaces of units and 3/8 inch on unformed surfaces.
- E. Cure units as follows:
 - 1. Cure units in enclosed moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F for 12 hours or 70 deg F for 16 hours.
 - 2. Keep units damp and continue curing to comply with one of the following:

- a. No fewer than five days at mean daily temperature of 70 deg F or above.

F. Colors and Textures: Match existing units.

G. Color and Texture: Provide units with fine-grained texture and buff color resembling color of existing stone.

2.3 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666

B. Dowels: 1/2-inch- diameter, round bars, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666

2.4 MORTAR MIXES

A. Comply with requirements in Division 04, Section "Unit Masonry" for mortar mixes.

- 1. Do not use calcium chloride in mortar or grout.
- 2. Use masonry cement mortar unless otherwise indicated.

B. Comply with ASTM C 270, Proportion Specification.

- 1. For setting mortar, use Type N.
- 2. For pointing mortar, use Type N.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

A. Install cast stone units to comply with requirements in Division 04, Section "Unit Masonry."

B. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

- 1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.

2. Coordinate installation of cast stone with installation of flashing specified in other Sections.
- C. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- D. Set units in full bed of mortar with full head joints unless otherwise indicated.
 1. Set units with joints 3/8 to 1/2 inch wide unless otherwise indicated.
 2. Build anchors and ties into mortar joints as units are set.
 3. Fill dowel holes and anchor slots with mortar.
 4. Fill collar joints solid as units are set.
 5. Build concealed flashing into mortar joints as units are set.
 6. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
- E. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
- F. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- G. Provide sealant joints at copings and other horizontal surfaces, at expansion, control, and pressure-relieving joints, and at locations indicated.
 1. Keep joints free of mortar and other rigid materials.
 2. Build in compressible foam-plastic joint fillers where indicated.
 3. Form joint of width indicated, but not less than 3/8 inch.
 4. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
 5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Division 07, Section "Concrete Joint Sealants."

3.3 ADJUSTING AND CLEANING

- A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.
- B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean cast stone as work progresses.
 1. Remove mortar fins and smears before tooling joints.
 2. Remove excess sealant immediately, including spills, smears, and spatter.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
3. Clean precast stone by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.

END OF SECTION 04 72 00

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SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

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.
- B. Section Includes:
 - 1. Structural steel.
 - 2. Field-installed shear connectors.
 - 3. Grout.
- C. Related Requirements:
 - 1. Division 09 Section 099600 "High-Performance Coatings" for surface-preparation and priming requirements.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- B. Heavy Sections: Rolled and built-up sections as follows:
 - 1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches.
 - 2. Welded built-up members with plates thicker than 2 inches.
 - 3. Column base plates thicker than 2 inches.
- C. Protected Zone: Structural members or portions of structural members indicated as "Protected Zone" on Drawings. Connections of structural and nonstructural elements to protected zones are limited.
- D. Critical Welds: Those welds, the failure of which would result in significant degradation of the strength and stiffness of the Seismic-Load-Resisting System and which are indicated as "Critical" or "Seismic Critical" welds.

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
 - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 - 5. Identify demand critical welds.
- C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:
 - 1. Power source (constant current or constant voltage).
 - 2. Electrode manufacturer and trade name, for demand critical welds.
- D. Delegated-Design Submittal: For structural-steel connections indicated to comply with design loads, include analysis data and signed and sealed calculations and drawings prepared by a qualified professional engineer registered in the state of Massachusetts.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, fabricator, and testing agency.
- B. Welding certificates.
- C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- D. Product Test Reports: For the following:
 - 1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - 2. Direct-tension indicators.

3. Tension-control, high-strength, bolt-nut-washer assemblies.
 4. Shear stud connectors.
 5. Shop primers.
 6. Nonshrink grout.
- E. Field quality-control reports.

1.7 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
- C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P3 or to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8/D1.8M. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- E. Comply with applicable provisions of the following specifications and documents:
1. AISC 303.
 2. AISC 341 and AISC 341s1.
 3. AISC 360.
 4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A 572/A 572M, Grade 50.
- B. Channels, Angles: ASTM A 572/A 572M, Grade 50.
- C. Plate and Bar: ASTM A 572/A 572M, Grade 50.
- D. Cold-Formed Hollow Structural Sections: ASTM A 1085, structural tubing.
- E. Corrosion-Resisting, Cold-Formed Hollow Structural Sections: ASTM A 847/A 847M, structural tubing.
- F. Steel Pipe: ASTM A 53/A 53M, Type E or Type S, Grade B.
 1. Weight Class: Standard.
 2. Finish: Galvanized.
- G. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436, Type 1, hardened carbon-steel washers.
 1. Finish: Hot-dip or mechanically deposited zinc coating.
 2. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.
- B. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.
 1. Finish: Hot-dip or mechanically deposited zinc coating.
 2. Direct-Tension Indicators: ASTM F 959, Type 490 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.
- C. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.3 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," and to AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.
 - 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
 - 4. Mark and match-mark materials for field assembly.
 - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
 - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- F. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural-steel frame. Straighten as required to provide uniform, square, and true members in completed wall framing. Build up welded framing, weld exposed joints continuously, and grind smooth.
- G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
 - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
 - 3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.5 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, pretensioned, and slip critical.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.6 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (
 - 2. Surfaces to be field welded.
 - 3. Surfaces of high-strength bolted, slip-critical connections.
 - 4. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the paint manufacturer's requirements. Refer to specification section 09 96 00 "High Performance Coatings".
- C. Priming: Prime steel in accordance with paint manufacturer's requirements. Refer to specification section 099600 "High Performance Coatings" for painting systems.
- D. Painting: Prepare steel and apply paint system in accordance with paint manufacturer's requirements. Refer to specification section 09 96 00 "High Performance Coatings" for painting systems.

2.7 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
 - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Bolted Connections: Inspect and test shop-bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Visually inspect shop-welded connections according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 3. Ultrasonic Inspection: ASTM E 164.
- D. In addition to visual inspection, test and inspect shop-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- E. Prepare test and inspection reports.
- F. Contractor to correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - 1. Joint Type: Snug tightened, pretensioned, and slip critical.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
 - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in AISC 303, "Code of Standard Practice for Steel Buildings and Bridges," for mill material.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
 1. Verify structural-steel materials and inspect steel frame joint details.
 2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- C. Bolted Connections: Inspect and test bolted connections according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: Visually inspect field welds according to AWS D1.1/D1.1M.
 1. In addition to visual inspection, test and inspect field welds according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E 164.
 - d. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
 2. Conduct tests according to requirements in AWS D1.1/D1.1M on additional shear connectors if weld fracture occurs on shear connectors already tested.
- F. Contractor to correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

- A. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- B. Touchup Priming: Cleaning and touchup priming are specified in Division 09 Sections "High-Performance Coatings."

END OF SECTION 05 12 00

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SECTION 05 16 17 - STRAND GUARDRAIL SYSTEM

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. This Section includes the following metal fabrications:
 - 1. Strand guardrail.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 05 Section "Structural Steel Framing" for structural steel framing system components.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01 Specification Sections.
- B. Shop drawings detailing fabrication and installation of strand guardrail system. Include plans, elevations, sections, and details of fabrications and their connections. Show anchorage and accessory items. Provide templates for anchors and bolts.
- C. Installation drawings shall include:
 - 1. Number, arrangement, and length of strand guardrails.
 - 2. Jacking force required to achieve specified final effective force for all strand guardrails.
 - 3. Cable elongations corresponding to jacking force and final effective force for all strand guardrails.
 - 4. Detailing of anchorage devices.
 - 5. Other incidental features.
- D. Submit following information with Installation Drawing submittal:
 - 1. Sealed calculations, prepared under supervision of a Professional Engineer licensed in New Hampshire for jacking force required to achieve specified final effective strand pretension for all strand guardrails considering strand length, losses due to anchorage seating, and materials and equipment being supplied.
 - 2. Certified calibration curve for each jack to show the gauge pressure corresponding to the required jacking force.

- E. Samples representative of materials and finished products as may be requested by Engineer/Architect.
- F. Qualification data for firms and persons specified in the "Quality Assurance" article to demonstrate their capabilities and experience. Include a list of completed projects with project name, addresses, names of architects and owners, and other information specified.
- G. Stressing records to Engineer/Architect promptly upon completion of stressing operations.
- H. Certification from Installer that stressing process and records have been reviewed, and that forces specified have been provided.
- I. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- J. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Firm experienced in producing guardrail strand fabrications similar to those indicated for this Project with a record of successful in-service performance, and with sufficient production capacity to produce required units without delaying the Work.
- B. Provide barrier cable systems produced in PTI-certified plant conforming to all material and installation requirements of PTI "Specifications for Seven Wire Strand Barrier Cable Applications".
- C. Installer Qualifications: All barrier cable systems using seven-wire prestressing steel strands shall be installed by PTI certified installers.
- D. Work shall conform to requirements of PTI "Specifications for Seven Wire Strand Barrier Cable Applications" except where more stringent requirements are shown on Drawings or specified in this Section.
- E. Inspection Agency employed by Owner shall keep barrier cable stressing records and submit to Engineer/Architect. Report will document:
 - 1. Calculated elongation based upon actual elastic modulus and cross-sectional area of strands used.
 - 2. Actual field elongation measured for each guardrail strand.
 - 3. Gauge pressure required to achieve required jacking force [per calibration chart] for each strand.
 - 4. Actual gage pressures for each strand.
 - 5. Jack and gauge identification numbers.

1.5 REFERENCES

- A. American Institute of Steel Construction (AISC):
 - 1. AISC, "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. AISC, "Manual of Steel Construction."
 - 3. AISC, "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings."
- B. American Society for Testing and Materials (ASTM):
 - 1. ASTM A36, "Specification for Structural Steel."
 - 2. ASTM A123, "Specification for Zinc (Hot-Dip Galvanized) Coatings On Iron and Steel Products."
 - 3. ASTM A416, "Specification for Steel Strand, Uncoated Seven-Wire Stress-Relieved, for Prestressed Concrete."
 - 4. ASTM A475, "Specification for Zinc-Coated Steel Wire Strand."
 - 5. ASTM A882, "Standard Specification for Epoxy-Coated Seven-Wire Prestressing Steel Strand."
 - 6. ASTM B633, "Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel."
 - 7. ASTM B695, "Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel."
- C. Post-Tensioning Institute
 - 1. PTI M 10.4-07, "Specification for Seven Wire Prestressed Steel Strand for Barrier Cable Applications."

1.6 PROJECT CONDITIONS

- A. Field Measurements: Check actual locations of walls and other construction to which strand guardrails must fit by accurate field measurements before fabrication. Show recorded measurements on final shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 FERROUS METALS

- A. General: Comply with Post-Tensioning Institute's "Specification for Seven Wire Steel Strand Barrier Cable Applications."
- B. Handrail Strand and Terminal Fittings: 7 wire, steel wire strand, ASTM A 475, Common Grade, Class A zinc coating, 0.5 in. diameter. Terminal fittings to be:
 - 1. Swaged and threaded stubs with washers and nuts as shown on Drawings, stainless steel, ASTM A 320, Grade B8F, AISI Type 303 Se, and:

2. Similar to threaded stud No. MS 21259-12, Loos and Company, Inc., Pomfret, Connecticut.

C. Guardrail Strand and Prestressing/Post-Tensioning Anchors:

1. Seven wire, steel strand, 0.5 in. diameter, galvanized stress-relieved prestressing strand, with minimum ultimate tensile strength of 250,000 psi.
2. Strand to have continuous hot-dip galvanized coating. Minimum weight of zinc coating shall be 0.90 oz./sq. ft.(Class A).
3. Anchor bodies shall be galvanized and compatible with strand system furnished. Anchor bodies shall comply with Post-Tensioning Institute "Specification for Unbonded Single Strand Tendons." Environment: corrosive. Repair damaged metal surfaces by cleaning and applying two coats of galvanizing repair paint to galvanized surfaces. Apply two coats of galvanizing repair paint to wedge grippers after stressing is complete.
4. Anchor back seating force. Unless noted otherwise, back seat all anchors to a force equal to 80% of the minimum ultimate tensile strength (MUTS) of the strand.

D. Guardrail Strand and Terminal Fittings:

1. Seven wire, steel strand, 0.5 in. diameter, ASTM A416, with minimum ultimate tensile strength of 270,000 psi.
2. Epoxy-coated strand shall comply with requirements of ASTM A882 "Standard Specification for Epoxy-Coated 7-Wire Steel Strand. Thickness: 30 mil minimum. Color: black.
3. Anchor bodies shall be galvanized and compatible with strand system furnished. Anchor bodies shall comply with Post-Tensioning Institute "Specification for Unbonded Single Strand Tendons." Environment: corrosive. Repair damaged metal surfaces by cleaning and applying two coats of galvanizing repair paint to galvanized surfaces. Apply two coats of galvanizing repair paint to wedge grippers after stressing is complete.
4. Anchor back seating force. Unless noted otherwise, back seat all anchors to a force equal to 80% of the minimum ultimate tensile strength (MUTS) of the strand.

2.2 FABRICATION, GENERAL

- A. Form strand guardrail from materials of size, thickness, and shapes indicated but not less than that needed to comply with performance requirements indicated. Work to dimensions indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of each metal fabrication.
- B. Allow for thermal movement resulting from the following maximum change (range) in ambient temperature in the design, fabrication, and installation of installed strand guardrail assemblies to prevent over stressing. Base design calculations on actual surface temperatures of metals due to both solar heat gain and nighttime sky heat loss.
 1. Temperature Change (Range): 100 F°.

- C. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space anchoring devices to secure strand guardrails rigidly in place and to support indicated loads.
- D. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- E. Fabricate joints that will be exposed to weather in a manner to exclude water.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installing anchorages. Coordinate delivery of such items to Project site.

3.2 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchor bodies where necessary for securing miscellaneous metal fabrications to in-place construction.
- B. If the guardrail strands are required to be post-tensioned:
 - 1. Backstress all fixed and stressing anchorages.
 - 2. Stress, and then immediately backstress, individual guardrail strands one at a time.
 - 3. Backstress the guardrail strand to a force equal to 80% of the minimum ultimate tensile strength (MUTS) of the strand.
 - 4. Prevent damage to the column or other member to which the guardrail strand is anchored.
 - 5. For related procedures refer to the PTI Guide Specification.
- C. Do not cut strand ends until Contractor receives Engineer/Architect's written approval of stressing records.

3.3 ADJUSTING AND CLEANING

- A. For galvanized surfaces, clean welds, bolted connections, and abraded areas, and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 05 16 17

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SECTION 05 31 00 - STEEL DECKING

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. Composite floor deck.
- B. Related Requirements:
 - 1. Division 03 Section "Cast-in-Place Concrete" for normal-weight structural concrete fill over steel deck and reinforcing steel.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of deck, accessory, and product indicated.
- B. Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.
- C. LEED Submittals:
 - 1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

1.4 INFORMATIONAL SUBMITTALS

- A. Welder certificates signed by Contractor certifying that welders comply with requirements specified under the "Quality Assurance" article.
- B. Product certificates signed by manufacturers of steel deck certifying that their products comply with specified requirements.

- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
 - 1. Power-actuated mechanical fasteners.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed steel deck similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code - Sheet Steel."
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.6 REFERENCES

- A. American Institute of Steel Construction (AISC):
 - 1. AISC, "Code of Standard Practice for Steel Buildings and Bridges."
 - 2. AISC, "Manual of Steel Construction."
 - 3. AISC, "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings."
- B. American Iron and Steel Institute (AISI):
 - 1. AISI, "Specification for the Design of Cold-Formed Steel Structural Members."
- C. ASTM International (ASTM):
 - 1. ASTM A36, "Specification for Structural Steel."
 - 2. ASTM A525, "Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process."
 - 3. ASTM A653, "Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process."
 - 4. ASTM A1008A, "Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable."
 - 5. ASTM B633, "Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel."

- D. American Welding Society (AWS):
 - 1. AWS D1.1, "Structural Welding Code-Steel."
- E. National Association of Architectural Metal Manufacturers (NAAMM):
 - 1. NAAMM, "Metal Stair Manual."
- F. Steel Deck Institute (SDI):
 - 1. SDI Pub. #27, "Design Manual for Composite Decks, Form Decks, Roof Decks, and Cellular Metal Floor Deck with Electrical Distribution."

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1.8 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Buildings Co.
 - 2. ASC Pacific Inc.
 - 3. Bowman Metal Deck Armco, Inc.
 - 4. Consolidated Systems, Inc.
 - 5. Epic Metals Corp.
 - 6. Marlyn Steel Products, Inc.
 - 7. Robertson A United Dominion Co.
 - 8. Roof Deck, Inc.
 - 9. United Steel Deck, Inc.
 - 10. Verco Manufacturing Co.
 - 11. Vulcraft Div. of Nucor Corp.
 - 12. Walker Div. of Butler Manufacturing Co.
 - 13. Wheeling Corrugating Co., Div. of Wheeling-Pittsburgh Steel Corp.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."

2.2 COMPOSITE FLOOR DECK

- A. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
 - 1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33, G30 G60 zinc coating.
 - 2. Profile Depth: 3 inches.
 - 3. Design Uncoated-Steel Thickness: 0.0474 inch.
 - 4. Span Condition: Span to following direction of existing replacement landings in stairtowers.

2.3 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0474-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- E. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- F. Shear Connectors: ASTM A 108, Grade 1010 through 1020 headed stud type, cold-finished carbon steel, AWS D1.1, Type B.
- G. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.
- H. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Do not place deck panels on concrete supporting structure until concrete has cured and is dry.
- B. Locate decking bundles to prevent overloading of supporting members.

3.3 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install according to deck manufacturer's written instructions.

3.4 FLOOR-DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
 - 1. Weld Diameter: 3/4 inch nominal.
 - 2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches apart, but not more than 18 inches apart.

- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
 - 1. End Joints: butted.
 - 2. Shear Connectors: Weld shear connectors through deck to support framing according to AWS D1.1 and manufacturer's instructions. Butt end joints of deck panels; do not overlap.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet cell closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field welds will be subject to inspection.
- C. Shear connector welds will be inspected and tested according to the requirements of AWS D1.1 for stud welding and as follows:
 - 1. Shear connector welds will be visually inspected.
 - 2. Bend tests will be performed when visual inspections reveal either less than a continuous 360° flash or welding repairs to any shear connector.
 - 3. Tests will be conducted on additional shear connectors when weld fracture occurs on shear connectors already tested, according to the requirements of AWS D1.1.
- D. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- E. Remove and replace work that does not comply with specified requirements.
- F. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

3.6 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Repair Painting: Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Division 09 Section "Exterior Painting" and Division 09 Section "Interior Painting."
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 31 00

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SECTION 05 50 00 - METAL FABRICATIONS

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. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 - 2. Shelf angles.
 - 3. Abrasive metal nosings.
- B. Products furnished, but not installed, under this Section include the following:
 - 1. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
- C. Related Requirements:
 - 1. Division 03 Section "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
 - 2. Division 04 Section "Unit Masonry" for installing loose lintels, anchor bolts, and other items built into unit masonry.
 - 3. Division 05 Section "Structural Steel Framing."

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. 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.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
 2. Metal nosings.
 3. Paint products.
 4. Grout.
- B. Shop Drawings: Show fabrication and installation details. Provide Shop Drawings for the following:
1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 2. Abrasive metal nosings.
- C. Samples for Verification: For each type and finish of extruded nosing and tread.

1.5 INFORMATIONAL SUBMITTALS

- A. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- B. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
1. Temperature Change: 120 deg F ambient; 180 deg F material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide **Type 304** stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening galvanized steel.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts and where indicated, flat washers.
- C. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- D. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- E. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

2.4 MISCELLANEOUS MATERIALS

- A. Shop Primers: Provide primers that comply with Division 09 Sections "High-Performance Coatings."
- B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- C. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- D. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- E. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.

- F. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M. **Apply to exposed column bases and cross braces where concrete repairs are being made.**
- H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 WIRE ROPE PARKING GARAGE GUARDS

- A. Wire Rope Parking Garage Guards: 3/4-inch diameter, zinc-coated steel wire ropes with wire rope fittings for securing to parking garage columns and walls and for tightening wire rope.

2.7 PIPE GUARDS

- A. Fabricate pipe guards from 3/8-inch- thick by 12-inch- wide steel plate, bent to fit flat against the wall or column at both ends and to fit around pipe with 2-inch clearance between pipe and pipe guard. Drill each end for two 3/4-inch anchor bolts.
- B. Galvanize and prime pipe guards.

2.8 ABRASIVE METAL NOSINGS

- A. Cast-Metal Units: aluminum with an integral-abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in lengths necessary to accurately fit openings or conditions.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Safety Tread Co., Inc.
 - b. Balco, Inc.
 - c. Barry Pattern & Foundry Co., Inc.
 - d. Granite State Casting Co.
 - e. Safe-T-Metal Company, Inc.
 - f. Wooster Products Inc.
 - 2. Nosings: Cross-hatched units, 4 inches wide with 1/4-inch lip, for casting into concrete.
- B. Extruded Units: Aluminum, with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. [ACL Industries, Inc.](#)
 - b. [American Safety Tread Co., Inc.](#)
 - c. [Amstep Products.](#)
 - d. [Armstrong Products, Inc.](#)
 - e. [Balco, Inc.](#)
 - f. [Granite State Casting Co.](#)
 - g. [Nystrom, Inc.](#)
 - h. [Wooster Products Inc.](#)
2. Provide solid-abrasive-type units without ribs.
 3. Nosings: Square-back units, 3 inches wide, for casting into concrete steps.
 4. Nosings: Two-piece units, 3 inches wide, with subchannel for casting into concrete steps.
- C. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- D. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
- E. Apply bituminous paint to concealed surfaces of cast-metal units.
- F. Apply clear lacquer to concealed surfaces of extruded units.

2.9 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.10 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.11 STEEL AND IRON FINISHES

- A. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, or masonry, or unless otherwise indicated.

- C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 3, "Power Tool Cleaning." requirements indicated below:
 - 1. Items Indicated to Receive Primers Specified in Division 09 Section "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.
- C. Install pipe columns on concrete footings with grouted baseplates. Position and grout column baseplates as specified in "Installing Bearing and Leveling Plates" Article.
 - 1. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING NOSINGS, TREADS, AND THRESHOLDS

- A. Center nosings on tread widths unless otherwise indicated.
- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.
- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Division 07 Section Concrete Joint Sealants" or Architectural Joint Sealants to provide a watertight installation.

3.4 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION 05 50 00

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SECTION 07 18 00 – TRAFFIC COATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. A single installer shall be responsible for providing complete water proofing system including all products specified in following Sections:
 - 1. Division 07 Section, "Traffic Coatings"
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 07 Section, "Concrete Joint Sealants"
 - 4. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes traffic coating: Fluid applied, waterproofing, traffic-bearing elastomeric membrane with integral wearing surface, where surface to which membrane is to be applied is one or more of following:
 - 1. Over assigned parking.
 - 2. Roof top parking.
 - 3. Over office area
- C. Materials shall be compatible with materials or related Work with which they come into contact, and with materials covered by this Section.
- D. Related Sections: Following Sections contain requirements that relate to this Section.
 - 1. Division 03 Section, "Cast-in-Place Concrete."
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 07 Section, "Concrete Joint Sealants"
 - 4. Division 07 Section, "Expansion Joint Assemblies"
 - 5. Division 09 Section, "Pavement Markings."

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Distribute reviewed submittals to all others whose Work is related.
- B. Pre-installation Conference: Meet at project site well in advance of time scheduled for Work to proceed to review requirements for Work and conditions that could interfere with successful coating performance. Require every party concerned with coating Work, or

required to coordinate with it or protect it thereafter, to attend. Include manufacturer's technical representative and warranty officer.

- C. Make submittals in accordance with requirements of Division 01 Section, "Submittal Procedures:"
 - 1. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
 - 2. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.
- D. Submittals and Resubmittals: Engineer will review each of Contractor's shop drawings and/or submittal data initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including cost of Engineer's services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.
- E. Requests For Information
 - 1. Engineer reserves right to reject, unprocessed, any Request for Information (RFI) that Engineer, at its sole discretion, deems frivolous and/or deems already answered in the Contract Documents.
 - 2. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in Contract documents.

1.4 ACTION SUBMITTALS

- A. Product Data: For each system indicated, submit the following at least 60 days prior to application.
 - 1. Product description, technical data, appropriate applications and limitations.
 - 2. Primer type and application rate
 - 3. Material, and wet mils required to obtain specified dry thickness for each coat.
 - 4. Type, gradation and aggregate loading required within each coat.
- B. Samples:
 - 1. One 4 in. by 4 in. stepped sample showing each component for each system indicated.
- C. Sample Warranty: For each system indicated.

1.5 INFORMATION SUBMITTALS

- A. Certificates

1. Evidence of applicator's being certified by manufacturer. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.
2. Certification from Manufacturer that finishes as specified are acceptable for system to be installed at least 1 month before placement of any concrete which will receive traffic coating.
3. Certification stating static coefficient of friction meets minimum requirements of Americans with Disabilities Act (ADA).
4. Certification stating materials have been tested and listed for UL 790 Class "A" rated materials/system by UL for traffic coating application specified on project. Containers shall bear UL labels.
5. Certification from manufacturer confirming compatibility with existing underlying coatings and/or substrate.

B. Manufacturer's Instructions: for each system indicated.

1. Crack treatment and surface preparation method and acceptance criteria.
2. Method of application of each coat.
3. Maximum and minimum allowable times between coats.
4. Final cure time before resumption of parking and/or paint striping.
5. Any other special instructions required to ensure proper installation.

C. Field Quality Control:

1. Quality Control Plan as defined in Part 3.
2. Two copies each of manufacturer's technical representative's log for each visit.
3. Testing agency field reports.

D. Qualification Statements

1. Manufacturer's qualifications as defined in "Quality Assurance" article.
2. Installer's qualifications as defined in "Quality Assurance" article.
3. Signed statement from applicator certifying that applicator has read, understood, and shall comply with all requirements of this Section.

1.6 CLOSEOUT SUBMITTALS

- A. Three copies of System Maintenance Manual.
- B. Five copies of snow removal guidelines for areas covered by Warranty.
- C. Final executed Warranty.

1.7 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Owner retains right to reject any manufacturer.
 1. Evidence of acceptable previous work on WALKER-designed projects. If none, so state.

2. Evidence of financial stability acceptable to Engineer/Architect.
3. Listing of 20 or more projects completed with submitted system, to include:
 - a. Name and location of project.
 - b. Type of system applied.
 - c. On-Site contact with phone number.
- B. Manufacturer's technical representative, acceptable to Engineer/Architect, shall be on site during surface preparation and initial stages of installation.
- C. Installer's Qualifications: Owner retains right to reject any manufacturer.
 1. Evidence of compliance with Summary article paragraph "A single installer. . ."
 2. Evidence that installer has successfully performed or has qualified staff who have successfully performed at least 5 verifiable years of installations similar to those involved in this Contract, and minimum 10 projects with submitted system.
 3. Listing of 5 or more installations in climate and size similar to this Project performed by installer's superintendent.
- D. Testing Agency: Independent testing laboratory employed by Owner and acceptable to Engineer/Architect.
- E. Certifications
 1. Traffic coating shall satisfy current National Volatile Organic Compound (VOC) Emission Standards for Architectural Coatings.
 2. Licensing/certification document from manufacturer that confirms system installer is a licensed/certified applicator for the manufacturer and is legally licensed to perform work in the state this project is being constructed.
 3. Licensing/certification agreement shall include following information:
 - a. Applicator's financial responsibility for warranty burden under agreement terms.
 - b. Manufacturer's financial responsibility for warranty burden under agreement terms.
 - c. Process for dispute settlement between manufacturer and applicator in case of system failures where cause is not evident or cannot be assigned.
 - d. Authorized signatures for both Applicator Company and Manufacturer.
 - e. Commencement date of agreement and expiration date (if applicable).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
 1. Name of product.
 2. Name of manufacturer.
 3. Date of preparation.
 4. Lot or batch number.

- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.

1.9 FIELD CONDITIONS

- A. Weather and Substrate Conditions: Proceed with work only when existing and forecast weather and temperature of concrete substrate will permit work in accordance with manufacturer's recommendations.

1.10 WARRANTY

- A. System Manufacturer New Application and Complete System Recoating: Furnish Owner with written total responsibility Joint and Several Warranty, detailing responsibilities of manufacturer and applicator with regard to warranty requirements (Joint and Several). Warranty shall provide that system will be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of:
 - 1. Any adhesive or cohesive failures.
 - 2. Spalling surfaces.
 - 3. Weathering.
 - 4. Surface crazing (does not apply to traffic coating protection course).
 - 5. Abrasion or tear failure resulting from normal traffic use.
 - 6. Failure to bridge cracks less than 0.0625 in. or cracks existing at time of traffic coating installation on double tees only.
- B. If material surface shows any of defects listed above, supply labor and material to repair all defective areas and to repaint all damaged line stripes.
- C. Warranty period shall be a **5 year Joint and Several Warranty** commencing with date of acceptance of work.
- D. Perform any repair under this warranty at no cost to Owner.
- E. Address following in terms of Warranty: length of warranty, change in value of warranty – if any- based on length of remaining warranty period, transferability of warranty, responsibilities of each party, notification procedures, dispute resolution procedures, and limitations of liability for direct and consequential damages.
- F. Snowplows, vandalism, [**studded snow tires**] and abnormally abrasive maintenance equipment are not normal traffic use and are exempted from warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of 1 of following, only where specifically named in product category:

1. Advanced Polymer Technology (APT), Harmony, PA
2. BASF Building Systems (BASF), Shakopee, MN
3. Deneef Construction Chemicals (Deneef), Houston, TX.
4. Lymtal International Inc. (Lymtal), Lake Orion, MI.
5. Neogard Division of Jones-Blair Company (Neogard), Dallas, TX.
6. Pacific Polymers, Inc. a Division of ITW (Pacific Polymers), Garden Grove, CA
7. Pecora Corporation (Pecora), Harleysville, PA
8. Sika Corporation (Sika), Lyndhurst, NJ.
9. Technical Barrier Systems, Inc. (TBS), Oakville, Ontario.
10. Tremco (Tremco), Cleveland, OH.

2.2 MATERIALS, TRAFFIC COATING

- A. Acceptable **low odor** coatings are listed below. Coatings shall be compatible with all other materials in this Section and related work.
1. **Medium Duty: For use in Stairtower landings Only**
 - a. Autogard, Neogard.
 - b. MasterSeal Traffic 1500, BASF.
 - c. Qualideck Medium Vehicular MD-55 (152/252/372/512), APT
 - d. Sikalastic 710/715, Sika.
 - e. Vulkem 350NF/386/346 Deck Coating System, Tremco.
 2. **Heavy Duty: For Use On All Parking Level Floor Applications** VOC Compliant, **Extreme** Low Odor, High-Solids, Fast Cure, Heavy Duty Coating System:
 - a. AutoGard FC HD-48, Autogard E, Neogard.
 - b. MasterSeal Traffic 2500, BASF.
 - c. Qualideck Heavy Vehicular (152/252/372/512), APT
 - d. Sikalastic 720/745 or 390/391/395, Sika.
 - e. Vulkem 360NF/950NF and 951NF, Tremco.
 3. **Heavy Duty: For Use On All Parking Level Floor Applications** (Option) Hybrid VOC Compliant, Extreme Low Odor, High-Solids, Heavy Duty Coating System:
 - a. AutoGard E, Neogard.
 - b. MasterSeal Traffic 2530, BASF.
 - c. Qualideck (152/252/532E/512), APT
 - d. Sikalastic 22 Lo-Mod Hybrid (720/22 LM/745 AL), Sika.
 - e. Vulkem EWS, Tremco
- B. Recoating [**Complete System**]: Provide complete traffic coating system with all components specified for new, heavy-duty applications, including all waterproofing and wearing courses.
- C. Provide ultraviolet screening for all traffic coating placed on this project.
- D. **Drive Lanes and Turning Bays:** Flint type aggregate shall be provided on all traffic lanes and turning bays areas for improved wearing and traction. Aggregates

approved by the appropriate manufacturers shall be provided on a submittal and subject to review and approval by the Engineer.

- E. **Parking Stalls: Silica sand aggregate shall be provided on all parking stall and other floor areas. Aggregates approved by the appropriate manufacturers shall be provided on a submittal and subject to review and approval by the Engineer.**
- F. Finish top coat shall be colored grey and shall be a stable color with ultraviolet light resistance and good color retention.
- G. Substitutions: **None** for this project. Contact Engineer/Architect for consideration for future projects.

2.3 MATERIALS, CRACK SEALER

- A. Repair for isolated random horizontal cracks 0.01 in. to 0.03 in. wide. Acceptable products:
1. Denedeck Crack Sealer, Deneef.
 2. Iso-Flex 609 Epoxy Crack Sealer, Lyntal.
 3. MasterSeal 630, BASF.
 4. Sikadur 55 SLV Epoxy Crack Healer/Sealer, Sika.
 5. SikaPronto 19TF, Sika.
- B. All other cracks greater than .03 shall be routed and sealed with flexible joint sealant. All construction and control joints shall be routed and sealed with a flexible joint sealant that is compatible and warrantable with the traffic topping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive Work and report immediately in writing to Engineer/Architect any deficiencies in surface which render it unsuitable for proper execution of Work.
- B. Coordinate and verify that related Work meets following requirements before beginning surface preparation and application:
1. Concrete surfaces are finished as acceptable for system to be installed. Correct all high points, ridges, and other defects in a manner acceptable to Engineer/Architect.
 2. Curing compounds used on concrete surfaces are compatible with system to be installed.
 3. Concrete surfaces have completed proper curing period for system selected.
 4. Joint Sealants are compatible with traffic coatings.

3.2 PREPARATION

- A. Seal all openings to occupied space to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- B. Acid etching is prohibited.
- C. Remove all debonded traffic coatings. Remove all laitance and surface contaminants, including oil, grease and dirt, by shotblasting and appropriate degreasers, or as specified by manufacturer's written recommendations to provide warranty.
- D. Before applying materials, apply system to small area and perform adhesion pull testing to assure that it will adhere to substrate and joint sealants and dry properly and to evaluate appearance.
- E. All random cracks on concrete surface less than 0.03 in. wide and showing no evidence of water and/or salt water staining on ceiling below shall receive detail coat unless more complete treatment required in accordance with manufacturer's recommendations. Rout and seal random cracks, construction joints and control joints prior to installation of primer or base coat. Crack preparation including installation of joint sealant material, where required, is incidental to traffic coating work.
- F. All floor drains shall have concrete perimeter routed, joints primed and joint sealant installed per manufactures specification.
- G. Mask off adjoining surfaces not to receive traffic coating and mask off drains to prevent spillage and migration of liquid materials outside membrane area. Provide neat/straight lines at termination of traffic coating.

3.3 INSTALLATION/APPLICATION

- A. Installation should include all of the following steps:
 - 1. Surface Preparation: Prepare concrete for system application.
 - 2. Crack/Construction/Control/Cove Joint Sealing: Detail for crack bridging.
 - 3. Primer Coat: Insure proper adhesion of membrane to substrate.
 - 4. Base Coat: Provide crack spanning in conjunction with Crack Detail noted above.
 - 5. Aggregate Coat – to hold aggregate in system, providing skid and wear close up resistance.
 - 6. Aggregate: Correct size, shape, hardness and amount necessary to insure proper skid and wear resistance.
 - 7. Top Coat: Lock aggregate into place, provide a maintainable surface and provide resistance to ponding water, UV degradation, color loss and chemical intrusion.
- B. Do all Work in accordance with manufacturer's written instructions and specifications including, but not limited to, moisture content of substrate, atmospheric conditions (including relative humidity and temperature), coverages, mil thicknesses and texture, and as shown on Drawings.

- C. A primer coat is required for all systems. No exceptions.**
- D. Do not apply traffic coating material until concrete has been air dried at temperatures at or above 40°F for at least 30 days after curing period specified.
- E. Cease material installation under adverse weather conditions, or when temperatures are outside manufacturer's recommended limitations for installation, or when temperature of work area or substrate are below 40°F.
- F. All adjacent vertical surfaces shall be coated with traffic coating minimum of 4 in. above coated horizontal surface. Requirement includes, but is not limited to pipes, columns, walls, curbs (full height of vertical faces of all curbs) and islands.
- G. Complete all Work under this Section before painting line stripes.
- H. Clean off excess material and material smears adjacent to joints as work progresses using methods and materials approved by manufacturers.

3.4 FIELD QUALITY CONTROL

- A. Develop a quality control plan for assured specified uniform membrane thickness that utilizes grid system of sufficiently small size to designate coverage area of not more than 5 gallons at specified thickness. In addition, employ wet mil gauge to continuously monitor thickness during application. Average specified wet mil thickness shall be maintained within grid during application with minimum thickness of not less than 80% of average acceptable thickness. Immediately apply more material to any area not maintaining these standards.
- B. Testing Agency employ wet mil gauge to periodically monitor thickness during application.
- C. Install 1 trial section of coating system for each duty grade and/or recoat system specified. Do not proceed with further coating application until trial sections accepted in writing by Engineer/Architect. Remove and replace rejected trial sections with acceptable application. Trial section shall also be tested for:
 - 1. Wet mil thickness application.
 - 2. Adhesion to concrete substrate and/or existing coating(s).
 - 3. Overall dry mil thickness.
- D. Use trial sections to determine adequacy of pre-application surface cleaning. Obtain Owner, Engineer/Architect and manufacturer acceptance of:
 - 1. Cleaning before proceeding with traffic coating application.
 - 2. Visual appearance of finished coating application.
 - 3. Conformance to ADA static coefficient of friction.
 - 4. Elcometer or equivalent pull test to quantify traffic coating adhesion to concrete and existing traffic coating.
- E. Determine overall coating system mil thickness:

1. Contractor shall provide 6 in. by 6 in. bond breaker (coating coupon) on concrete surface for each 25,000 sq ft, or fraction thereof, of coating to be placed as directed by Engineer/Architect and manufacturer. Dimensionally locate coupon for easy removal.
2. Contractor shall assist Testing Agency in removing coating coupons from concrete surface at completion of manufacturer-specified cure period. Contractor shall repair coupon area per coating manufacturer's instructions.
3. Testing Agency shall determine dry mil thickness of completed Traffic Coating System, including bond breaker. Take 9 readings (minimum), 3 by 3 pattern at 2 in. on center. No reading shall be taken closer than 1 in. from coupon edge. Report individual readings and overall coating system average to Engineer/Architect. Readings shall be made with micrometer or optical comparator.

END OF SECTION 07 18 00

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SECTION 07 19 00 – WATER REPELLENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. A single installer shall be responsible for providing complete water proofing system including all products specified in the following Sections:
 - 1. Division 03 Section, "Cast-In-Place Concrete- Restoration"
 - 2. Division 03 Section, "Prepackaged Repair Mortar"
 - 3. Division 07 Section, "Traffic Coatings"
 - 4. Division 07 Section, "Water Repellents"
 - 5. Division 07 Section, "Concrete Joint Sealants"
 - 6. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes penetrating concrete sealer on these surfaces:
 - 1. Supported concrete floor and concrete roof surfaces (Garage Expansion Area).
- C. Related Sections: Following Sections contain requirements that relate to this Section.
 - 1. Division 03 Section, "Cast-in-Place Concrete - Restoration."
 - 2. Division 07 Section, "Concrete Joint Sealants"
 - 3. Division 07 Section, "Expansion Joint Assemblies"
 - 4. Division 09 Section, "Pavement Markings."

1.3 REFERENCES

- A. ASTM International (ASTM):
 - 1. ASTM D6489, "Standard Test Method for Determining the Water Absorption of Hardened Concrete Treated with a Water Repellent Coating."

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Materials shall be compatible with materials or related Work with which they come into contact, and with materials covered by this Section.
 - 2. Distribute reviewed submittals to all others whose Work is related.

- B. Make submittals in accordance with requirements of Division 01 Section, "Submittal Procedures:"
 - 1. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
 - 2. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.
- C. Submittals and Resubmittals: Engineer will review each of Contractor's shop drawings and/or submittal data the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer's services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.
- D. Requests For Information
 - 1. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
 - 2. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
 - 3. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated at least 60 days prior to application.
 - 1. Product description, technical data, appropriate applications, and limitations.
 - 2. Areas and application rates of materials to be applied.
 - 3. Proposed alternate application methods, if any.

1.6 INFORMATION SUBMITTALS

- A. Certificates
 - 1. Certification that products and installation comply with applicable federal, state of New Hampshire and local EPA, OSHA and VOC requirements regarding health and safety hazards.
 - 2. Evidence of applicator's being certified by manufacturer. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.
- B. Field Quality Control
 - 1. ASTM D6489 Test Results

2. Two copies of manufacturer's technical representative's log for each visit.

C. Qualification Statements

1. Manufacturer's qualifications as defined in the "Quality Assurance" article.
2. Installer's qualifications as defined in the "Quality Assurance" article.
3. Signed statement from applicator certifying that applicator has read, understood, and shall comply with all requirements of this Section.

1.7 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Owner retains right to reject any manufacturer.

1. Evidence of acceptable previous work on WALKER-designed projects. If none, so state.
2. Evidence of financial stability acceptable to Engineer/Architect.
3. Listing of 20 or more projects completed with submitted system, to include:
 - a. Name and location of project.
 - b. Type of system applied.
 - c. On-Site contact with phone number.

B. Installer's Qualifications: Owner retains right to reject any installer.

1. Evidence of compliance with Summary article paragraph "A single installer. . ."
2. Evidence that installer has successfully performed or has qualified staff who have successfully performed at least 5 verifiable years of installations similar to those involved in this Contract, and minimum 10 projects with submitted system.
3. Listing of 5 or more installations in climate and size similar to this Project performed by installer's superintendent.

C. Testing Agency: Independent testing laboratory employed by **Owner** and acceptable to Engineer/Architect.

D. Certifications

1. Sealer shall satisfy the current national and local Volatile Organic Compound (VOC) Emission Standards for Architectural Coatings.
2. Licensing/certification document from system manufacturer that confirms system installer is a licensed/certified applicator for the manufacturer and is legally licensed to perform work in the state of New Hampshire.
3. Licensing/certification agreement must provide following information:
 - a. Applicator's financial responsibility for warranty burden under agreement terms.
 - b. Manufacturer's financial responsibility for warranty burden under agreement terms.
 - c. Process for dispute settlement between manufacturer and applicator in case of system failures where cause is not evident or cannot be assigned.
 - d. Officers' signatures for both Applicator Company and Manufacturer.

- e. Commencement date of agreement and expiration date (if applicable).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
 - 1. Name of product.
 - 2. Name of manufacturer.
 - 3. Date of preparation.
 - 4. Lot or batch number.
- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.

1.9 FIELD CONDITIONS

- A. Weather and Substrate Conditions: Do not proceed with application (except with written recommendation of manufacturer) under any of the following conditions:
 - 1. Ambient temperature is less than 40° F.
 - 2. Substrate surfaces have cured for less than 1 month.
 - 3. Rain or temperatures below 40° F predicted for a period of 24 hours.
 - 4. Less than 24 hours after surfaces became wet.
 - 5. Substrate is frozen or surface temperature is less than 40° F.
 - 6. Wind velocities higher than manufacturer's specified limit to prevent solvent flash-off.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of one of following, only where specifically named in product category:
 - 1. Advanced Chemical Technologies Inc. (ACT), Oklahoma City, OK.
 - 2. BASF Building Systems (BASF), Shakopee, MN.
 - 3. GCP Applied Technologies (GCP), Cambridge, MA.
 - 4. Evonik Corporation (Evonik), Parsippany, NJ.
 - 5. Euclid Chemical Company (Euclid), Cleveland, OH.
 - 6. Lymtal International Inc. (Lymtal), Lake Orion, MI.
 - 7. Prosoco, Inc. (Prosoco), Lawrence, KS
 - 8. Sika Corporation (Sika), Lyndhurst, NJ.

2.2 MATERIALS, CONCRETE SEALER

- A. Silane Water-Based, (50% solids, 400 g/L or less VOC) (For precast plank floor area)
 - 1. MasterProtect H 400, 125 sf/g, BASF.
 - 2. Iso-Flex 618-50 WB, 125 sf/g, LymTal.
 - 3. Protectosil Aqua-Trete 40, 125 sf/g, Evonik.
- B.
 - 1. MasterProtect H 1000, 200 sf/g, BASF (**Masonry application**)
 - 2. Protectosil Chemtrete 40 VOC; 200 sf/g, Evonik
- C. Proposed substitutions: None for this project. Contact Engineer/Architect for consideration for future projects.

2.3 MATERIALS, CRACK SEALER

- A. Repair for isolated random non-moving (static) horizontal cracks 0.01 in. to 0.06 in. wide. Acceptable products:
 - 1. SikaPronto 19TF, Sika.
 - 2. Sikadur 55 SLV Epoxy Crack Healer/Sealer, Sika.
 - 3. MasterSeal 630, BASF.
 - 4. DeNeef Denepox I-40,GCP.
 - 5. Iso-Flex 609 Epoxy Crack Sealer, Lymtal.
- B. Repair of isolated moving (dynamic) horizontal cracks shall be in accordance with Division 07, Section "Concrete Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive Work and report immediately in writing to Engineer/Architect any deficiencies in surface which render it unsuitable for proper execution of Work.
- B. Coordinate and verify that related Work meets following requirements before beginning surface preparation and application:
 - 1. Concrete surface finishes are acceptable for system to be installed.
 - 2. Curing compounds used on concrete surfaces are compatible with system to be installed.
 - 3. Concrete surfaces have completed proper curing period for system selected.
 - 4. Control joint and expansion joint Work is complete and has been accepted by Engineer/Architect.

3.2 PREPARATION

- A. Seal all openings to occupied space to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- B. Acid etching is prohibited.
- C. Repair or replace all sealant materials damaged by surface preparation operations.
- D. Shot blast clean all surfaces to be sealed as acceptable to sealer manufacturer before sealer application. Shot blasting is not recommended or required for new slabs that are water cured per ACI 308, Paragraph 2.2. Cleaning method and materials shall be sufficient to allow absorption criteria stated in Field Quality Control article to be met. Prepare by sandblasting all surfaces inaccessible to shotblast equipment.
- E. Equipment used during floor slab cleaning shall not exceed height limitation of facility and shall not exceed 3,000 lb axle load or vehicle gross weight of 6,000 lb.
- F. Mask off adjoining surfaces not to receive sealer and mask off drains to prevent spillage and migration of liquid materials outside sealer area. Provide neat/straight lines at termination of sealer.

3.3 INSTALLATION/APPLICATION

- A. Do all Work in accordance with manufacturer's written instructions and specifications including, but not limited to, moisture content of substrate, atmospheric conditions (including relative humidity and temperature), coverage, mil thickness and texture, and as shown on Drawings.
- B. Clean all surfaces affected by sealer material overspray and repair all damage caused by sealer material overspray to adjacent construction or property at no cost to Owner.
- C. Clean off excess material as work progresses using methods and materials approved by manufacturer.

3.4 FIELD QUALITY CONTROL

- A. Install 3 trial sections of sealer to verify treated surface is not glazing as result of sealer application. If application of sealer causes glazing at trial section, contact sealer manufacturer to obtain written recommendations for solving problem. Do not proceed with sealer application following trial section applications until directed to do so in writing by Engineer/Architect.
- B. Testing Agency shall take a) 1 core from each trial section and b) 3 additional cores as directed by Engineer/Architect after sealer application to test for sealer effectiveness in accordance with ASTM D6489. Concrete core samples shall be taken 14 days after application of sealer. Report water absorption through top and bottom surfaces of core. Sealer shall reduce water absorption by at least 85 percent when compared with the unsealed bottom surface.

3.5 NON-CONFORMING WORK

- A. Unsatisfactory Field Quality Control test results shall be grounds for rejection of sealer or sealer application rate. Perform sealer reapplication at no additional cost to Owner.

END OF SECTION 07 19 00

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SECTION 07 92 33 –CONCRETE JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. A single installer shall be responsible for providing complete water proofing system including all products specified in the following Sections:
 - 1. Division 07 Section, "Traffic Coatings"
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes the following:
 - 1. Exterior joints in the following horizontal traffic bearing surfaces:
 - a. Construction and control joints in cast-in-place concrete.
 - b. Control joints in pour strips, slabs and topping slabs.
 - c. Joints between precast concrete units.
 - d. Perimeter of all floor drains.
 - e. Perimeter of floor penetrations identified on the Drawings.
 - f. Other joints as indicated on the Drawings.
 - 2. Exterior joints in the following vertical and horizontal non-traffic surfaces:
 - a. Construction joints in cast-in-place concrete.
 - b. Joints between precast concrete units.
 - c. Cove joints at intersection of horizontal and vertical concrete.
 - d. Exterior horizontal joints between precast and cast-in-place concrete. Color to match precast concrete.
 - e. Vertical and horizontal joints between precast beams and columns at tiers exposed directly to weather.
 - f. Other joints as indicated on the Drawings.
- C. Related Sections: Following Sections contain requirements that relate to this Section.
 - 1. Division 03 Section, "Cast-in-Place Concrete - Restoration."
 - 2. Division 07 Section, "Traffic Coatings."
 - 3. Division 07 Section, "Water Repellents."
 - 4. Division 07 Section, "Expansion Joint Assemblies."
 - 5. Division 09 Section, "Pavement Markings."

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Materials shall be compatible with materials or related Work with which they come into contact, and with materials covered by this Section.
 - 2. Distribute reviewed submittals to all others whose Work is related.
 - 3. Coordinate layout of joint system and approve methods for providing joints with precast concrete and concrete contractors.
- B. Make submittals in accordance with requirements of Division 01 Section, "Submittal Procedures:"
 - 1. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
 - 2. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.
- C. Submittals and Resubmittals: Engineer will review each of Contractor's shop drawings and/or submittal data the initial time and, should resubmittal be required, one additional time to verify that reasons for resubmittal have been addressed by Contractor and corrections made. Resubmittal changes/revisions/corrections shall be circled. Engineer will review only circled items and will not be responsible for non-circled changes/revisions/corrections and additions. Should additional resubmittals be required, Contractor shall reimburse Owner for all costs incurred, including the cost of Engineer's services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.
- D. Requests For Information
 - 1. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
 - 2. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
 - 3. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.4 ACTION SUBMITTALS

- A. Product Data: For each system indicated at least 14 days prior to application.
 - 1. Product description, technical data, appropriate applications and limitations.
 - 2. Primer type and application rate
- B. Samples:
 - 1. One for each system indicated.
- C. Sample Warranty: For each system indicated.

1.5 INFORMATION SUBMITTALS

A. Certificates:

1. Evidence of installer's being certified by manufacturer. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.
2. Certification from the Manufacturer that joint details as specified are acceptable for system to be installed at least 1 month before placement of any concrete which will receive joint sealant.

B. Field Quality Control:

1. Two copies each of manufacturer's technical representative's log for each visit.
2. Testing agency field and test reports.

C. Qualification Statements:

1. Manufacturer's qualifications as defined in the "Quality Assurance" article.
2. Installer's qualifications as defined in the "Quality Assurance" article.
3. Signed statement from this Section applicator certifying that applicator has read, understood, and shall comply with all requirements of this Section.

1.6 CLOSEOUT SUBMITTALS

A. Final executed Warranty.

1.7 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Owner retains right to reject any manufacturer.

1. Evidence of acceptable previous work on WALKER-designed projects. If none, so state.
2. Evidence of financial stability acceptable to Engineer/Architect.
3. Listing of 20 or more projects completed with submitted sealant, to include:
 - a. Name and location of project.
 - b. Type of sealant applied.
 - c. On-Site contact with phone number.

B. Manufacturer's technical representative, acceptable to Engineer/Architect, shall be on site during surface preparation and initial stages of installation.

C. Installer's Qualifications: Owner retains right to reject any installer or subcontractor.

1. Installer shall be legally licensed to perform work in the state of New Hampshire. Evidence of compliance with Summary article paragraph "A single installer. . ."

2. Evidence that installer has successfully performed or has qualified staff who have successfully performed at least 5 verifiable years of installations similar to those involved in this Contract, and minimum 10 projects with submitted sealant.
 3. Listing of 5 or more installations in climate and size similar to this Project performed by installer's superintendent.
- D. Testing Agency: Independent testing laboratory employed by Owner and acceptable to Engineer/Architect.
- E. Certifications:
1. Licensing/certification document from system manufacturer that confirms sealant installer is a licensed/certified applicator for the manufacturer and is legally licensed to perform work in the state of New Hampshire.
 2. Licensing/certification agreement shall include following information:
 - a. Applicator's financial responsibility for warranty burden under agreement terms.
 - b. Manufacturer's financial responsibility for warranty burden under agreement terms.
 - c. Process for dispute settlement between manufacturer and applicator in case of system failures where cause is not evident or cannot be assigned.
 - d. Authorized signatures for both Applicator Company and Manufacturer.
 - e. Commencement date of agreement and expiration date (if applicable).

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
1. Name of product.
 2. Name of manufacturer.
 3. Date of preparation.
 4. Lot or batch number.
- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.

1.9 FIELD CONDITIONS

- A. Weather and Substrate Conditions: Proceed with work only when existing and forecast weather and temperature of concrete substrate will permit work in accordance with manufacturer's recommendations.

1.10 WARRANTY

- A. Manufacturer: Furnish Owner with written total responsibility Joint and Several Warranty, detailing responsibilities of manufacturer and installer with regard to warranty

requirements (Joint and Several). The warranty shall provide that sealant will be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of:

1. Any adhesive or cohesive failures.
 2. Weathering.
 3. Abrasion or tear failure resulting from normal traffic use.
- B. If material surface shows any of defects listed above, supply labor and material to repair all defective areas and to repaint all damaged line stripes.
- C. Warranty period shall be a 5 year Joint and Several Warranty commencing with date of acceptance of work.
- D. Perform any repair under this warranty at no cost to Owner.
- E. Address the following in the terms of the Warranty: length of warranty, change in value of warranty – if any- based on length of remaining warranty period, transferability of warranty, responsibilities of each party, notification procedures, dispute resolution procedures, and limitations of liability for direct and consequential damages.
- F. Snowplows, vandalism, and abnormally abrasive maintenance equipment are not normal traffic use and are exempted from warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer: Subject to compliance with requirements, provide products of 1 of following, only where specifically named in product category:
1. BASF Building Systems (BASF), Shakopee, MN.
 2. Dow Corning Corp. (Dow Corning), Midland, MI.
 3. Pecora Corporation (Pecora), Harleysville, PA.
 4. Sika Corporation (Sika), Lyndhurst, NJ.
 5. Tremco (Tremco), Cleveland, OH.

2.2 MATERIALS, JOINT SEALANT SYSTEM

- A. Provide complete system of compatible materials designed by manufacturer to produce waterproof, traffic-bearing control joints as detailed on Drawings.
- B. Compounds used for sealants shall not stain masonry or concrete. Aluminum pigmented compounds not acceptable.
- C. Color of sealants shall match adjacent surfaces.
1. "ITP Soft Type Backer Rod," Industrial Thermo Polymers Limited, 2316 Delaware Ave., Suite 216, Buffalo, NY 14216. (800) 387-3847.

- 2. "MasterSeal 921 Backer Rod," BASF.
- D. Bond breakers and fillers: as recommended by system manufacturer.
- E. Primers: as recommended by sealant manufacturer.
- F. Acceptable sealants are listed below. Sealants shall be compatible with all other materials in this Section and related work.
- G. Acceptable polyurethane control joint sealants (traffic bearing):
 - 1. MasterSeal SL-2 or MasterSeal SL-2 SG, BASF.
 - 2. Iso-flex 880 GB or Iso-flex 881, Lyntal.
 - 3. Dynatrol II-SG or Urexpan NR 200, Pecora.
 - 4. Sikaflex-2c SL or Sikaflex-2c NS TG, Sika.
 - 5. THC-901, Vulkem 45SSL, Dymeric 240 FC or Dymonic 100, Tremco.
- H. Acceptable polyurethane vertical and cove joints sealants (non-traffic bearing):
 - 1. Sikaflex-2c NS EZ, Sika.
- I. Proposed Substitutions: None for this project. Contact Engineer/Architect for consideration for future projects.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive Work and report immediately in writing to Engineer/Architect any deficiencies in surface which render it unsuitable for proper execution of Work.
- B. Coordinate and verify that related Work meets following requirements before beginning installation
 - 1. Concrete surfaces are finished as acceptable for system to be installed.
 - 2. Curing compounds used on concrete surfaces are compatible with system to be installed.
 - 3. Concrete surfaces have completed proper curing period for system selected.

3.2 PREPARATION

- A. Seal all openings to occupied space to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- B. Correct unsatisfactory conditions before installing sealant system.
- C. Acid etching is prohibited.

- D. Grind joint edges smooth and straight with beveled grinding wheel before sealing. All surfaces to receive sealant shall be dry and thoroughly cleaned of all loose particles, laitance, dirt, dust, oil, grease or other foreign matter. Obtain written approval of method from system manufacturer before beginning cleaning.
- E. Final preparation of joints shall be a sandblast with medium that removes dust and ground material from surfaces to receive sealant.
- F. Check preparation of substrate for adhesion of sealant.
- G. Prime and seal joints and protect as required until sealant is fully cured. A primer coat is required for all systems.

3.3 INSTALLATION/APPLICATION

- A. Do all Work in strict accordance with manufacturer's written instructions and specifications including, but not limited to, moisture content of substrate, atmospheric conditions (including relative humidity and temperature), thicknesses and texture, and as shown on Drawings.
- B. Completely fill joint without sagging or smearing onto adjacent surfaces.
- C. Self-Leveling Sealants: Fill horizontal joints slightly recessed to avoid direct contact with wheel traffic.
- D. Non-Sag Sealants: Tool joints concave: Wet tooling not permitted.
- E. Clean off excess material and material smears adjacent to joints as work progresses using methods and materials approved by manufacturers.
- F. Cease material installation under adverse weather conditions, or when temperatures are outside manufacturer's recommended limitations for installation, or when temperature of work area or substrate are below 40°F.

3.4 FIELD QUALITY CONTROL

- A. Contractor and Engineer/Architect will jointly determine which one of following 2 methods of sealant testing to verify sealant profile:
 - 1. Contractor, at Engineer/Architect's direction, shall cut out lesser of 1% of total lineal footage placed or total of 100 lineal ft of joint sealant at isolated/random locations (varying from in. to ft of material) for Engineer/Architect and Manufacturer's Representative inspection of sealant profile.
 - 2. Contractor, at Engineer/Architect's direction, shall install 3 trial joint sections of 20 ft each. Contractor shall cut out joint sections, as selected by Engineer/Architect, for Engineer/Architect and Manufacturer's Representative inspection. Additional isolated/random removals may be required where sealant appears deficient. Total cut out sealant shall not exceed lesser of 1% of total lineal footage placed or total of 100 lineal ft of joint sealant at isolated/random locations (varying from

in. to ft of material) for Engineer/Architect and Manufacturer's Representative inspection of sealant profile.

- B. Repair all random joint sealant "cut out" sections at no cost to Owner.
- C. Flood test joints with hose wet down to determine sealant effectiveness. Observe joints from below. If leakage or dripping occurs sealant will be considered as failed and contractor shall replace sealant and re-test joints at their expense.
- D. Testing Agency:
 - 1. Check shore hardness per ASTM standard specified in sealant manufacturer's printed data.
 - 2. If flood test of joints required by this Section, report results to Engineer/Architect.

END OF SECTION 07 92 33

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SECTION 07 92 36 – ARCHITECTURAL 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. Non-staining silicone joint sealants.
 - 3. Urethane joint sealants.
- B. Related Requirements:
 - 1. Division 07, Section "Concrete Joint Sealants" for sealing joints in horizontal traffic-bearing areas and vertical joints in concrete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Sustainable Design Submittals:
 - 1. Product Data: For sealants, indicating VOC content.
 - 2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
- C. 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.
- D. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- E. Joint-Sealant Selection: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified testing agency.
- B. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- C. Field-Adhesion-Test Reports: For each sealant application tested.
- D. Sample Warranties: For special warranties.

1.5 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.
- C. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.
- D. 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.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.
- B. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.

4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

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. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

- A. Silicone, S, NS, 50, NT: Single-component, non-sag, plus 50 percent and minus 50 percent movement capability, non-traffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Dow Corning Corporation.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.
 - c. Pecora Corporation.
 - d. Sika Corporation.

2.3 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Non-staining; 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.
 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. BASF Corporation-Construction Systems.
 - b. Construction Foam Products; a division of Nomaco, Inc.
- B. Cylindrical Sealant Backings: ASTM C 1330, Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated], and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.4 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.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

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. Precast Concrete.
 - b. Masonry.

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. Glass.
- 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.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

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 bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. 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.
- F. Tooling of Non-sag 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.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
 - b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.
2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
 - a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.

- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 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.

3.6 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 07 92 36

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SECTION 07 95 00 – EXPANSION JOINT ASSEMBLIES

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. A single installer shall be responsible for providing complete water proofing system including all products specified in the following Sections:
 - 1. Division 07 Section, "Traffic Coatings"
 - 2. Division 07 Section, "Water Repellents"
 - 3. Division 07 Section, "Concrete Joint Sealants"
 - 4. Division 07 Section, "Expansion Joint Assemblies"
- B. This Section includes the following:
 - 1. Standard expansion joint systems:
 - a. Elastomeric concrete edged, extruded rubber joint system
 - b. Adhered extruded rubber joint system
 - c. Extruded neoprene closed cell rubber joint system.
- C. Related Sections: The following Sections contain requirements that relate to this section:
 - 1. Division 03 Section "Cast-in-Place Concrete".
 - 2. Division 04 Section "Unit Masonry" for masonry wall joint systems.
 - 3. Division 07 Section "Concrete Joint Sealants" for liquid-applied joint sealants.
 - 4. Division 09 Section "Pavement Markings".

1.3 DEFINITIONS

- A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.
- C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage (plus or minus) of nominal value of joint width. Movement capability is to include anticipated movements from concrete shrinkage, concrete shortening and creep

from post-tensioning or prestressing, cyclic thermal movements, and seismic movements.

- D. Nominal Joint Width: Width of linear opening specified in practice and in which joint system is installed.
- E. Nominal Form Width: Linear gap in joint system at time of forming or erection of structural elements bounding the expansion joint.
- F. Service Load Level: Defined level of load under which joint assembly remains elastic and fully functional.
- G. Fatigue Load Level: Defined level of load under which joint assembly remains elastic and fully functional, including all noise mitigation components, for the stated number of cycles.
- H. Collapse Load Level: Defined level of load under which joint assembly remains capable of bridging the gap, although plates may yield and components may break.

1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. General:
 - a. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.
 - b. Coordinate requirements for transitions, tolerances, levelness, and plumbness to ensure the installed expansion joint system can perform with expected movement capabilities.
 - c. Coordinate and assign responsibility for preparation of concrete surfaces adjacent to expansion joints.
 - d. Expansion joint surface areas each side of joint gap shall have a vertical differential less than $\frac{1}{4}$ " and meet requirements of expansion joint manufacturer.
 - e. Minor surface defects shall be repaired according to manufacturer's recommendations. Repair materials shall be compatible with intended system materials and shall be approved by the Engineer prior to surface preparation and installation.
 - f. Submit for approval repair products and procedures for all major defects. Repair description shall indicate materials, manufacturer's requirements, expected service life, and maintenance requirements. Take all precautions necessary to avoid damaging adjacent surfaces and embedded reinforcement or post tensioned anchors and tendons. Contractor is responsible for any damages. Concrete repairs shall be of rectangular configuration, with no feather-edged surfaces. Final surface preparation of all repairs shall be sandblasting, or approved equivalent.

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EXPANSION JOINT ASSEMBLIES

services made necessary to review such additional resubmittals. Owner shall in turn reimburse Engineer.

E. Requests For Information

1. Engineer reserves the right to reject, unprocessed, any Request for Information (RFI) that the Engineer, at its sole discretion, deems frivolous.
2. Engineer reserves the right to reject, unprocessed, any RFI that the Engineer, at its sole discretion, deems already answered in the Contract Documents.
3. RFI process shall not be used for requesting substitutions. Procedures for substitutions are clearly specified elsewhere in the contract documents.

1.5 ACTION SUBMITTALS

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

1. Construction details, material descriptions, dimensions, and finishes.
2. Proposed method of preparation of concrete surface to receive expansion joint systems.
3. Proposed method and details for treatment of cracks, bugholes, or other potential concrete surface defects in areas to receive expansion joint systems.
4. Horizontal spacing between embedded metals and plates to allow for volume change due to thermal conditions.
5. Temperature adjustment table showing formed gap at the time of concrete placement calculated at 10°F increments and a calculation showing joint system is capable of movement within the design temperature range.

B. Shop Drawings: For each type of product indicated:

1. Placement Drawings: Show project conditions including, but not limited to, line diagrams showing plans, elevations, sections, details, splices, blockout requirement, and terminations. Provide isometric or clearly detailed drawings depicting how components interconnect. Include reviewed and approved details from others whose work is related. Other information required to define joint placement or installation.
2. Joint System Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:
 - a. Manufacturer and model number for each joint system.
 - b. Joint system location cross-referenced to Drawings.
 - c. Form width.
 - d. Nominal joint width.
 - e. Movement capability.
 - f. Minimum and maximum joint width.
 - g. Classification as thermal or seismic.
 - h. Materials, colors, and finishes.
 - i. Product options.
3. Components and systems required to be designed by a professional engineer, shall bear such professional's written approval when submitted.

C. Samples:

1. Samples for each type of joint system indicated.
 - a. Submit 2 samples for each type. Full width by 6 inches for each system required.
 - b. Field samples of premolded joint sealant. Width, thickness and durometer hardness of sealant shall be checked by Testing Agency. Upward buckling caused by joint gap closure shall be limited to a maximum of ¼ inch per ADA Guidelines.

1.6 INFORMATIONAL SUBMITTALS

A. Certificates

1. Certification that products and installation comply with applicable federal, state of New Hampshire , and local EPA, OSHA and VOC requirements regarding health and safety hazards. [
2. ADA Certification: Prior to installation, submit written certification from manufacturer indicating that expansion joints conform to Americans with Disabilities Accessibility Guidelines for Buildings and Facilities, as published by U.S. Architectural & Transportation Barriers Compliance Board, 1331 F Street, N.W., Suite 1000, Washington, DC 20004-1111. 1-800-872-2253.
 - a. Submit test reports from accredited laboratory attesting to joint systems' movement capability and ADA compliance.
 - b. Static coefficient of friction shall meet minimum requirements of Americans with Disabilities Act (ADA).
3. Signed statement from installer/applicator certifying that installer/applicator has read, understood, and shall comply with all requirements of this Section.
4. Signed statement from manufacturer's representative that they have read, understood, and shall comply with all requirements of this section.

B. Field Quality Control

1. Two copies each of manufacturer's technical representative's log for each visit.

C. Qualification Statements

1. Manufacturer's qualifications as defined in the "Quality Assurance" article within 60 days of project award.
2. Installer's qualifications as defined in the "Quality Assurance" article.
3. Evidence of manufacturer's certification of installer/applicator. Evidence shall include complete copy of manufacturer's licensing/certification document, spelling out repair responsibility for warranty claims.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Contracts: 2 copies of Maintenance Program contracts.
- B. Operation and Maintenance Data
 - 1. Maintenance Manual: 3 copies of System Maintenance Manual.
 - 2. Five copies of snow removal guidelines for areas covered by warranty.
- C. Warranty Documentation: 2 executed copies of Labor and Material Warranty including all terms, conditions and maintenance requirements.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Owner retains right to reject any manufacturer.
 - 1. Evidence of compliance with Experience Record and Qualifications paragraph below.
 - 2. Evidence of acceptable previous work on WALKER-designed projects. If none, so state.
 - 3. Copy of sample warranty that meets the requirements of the "Warranty" article in Section 1.
 - 4. Evidence of financial stability acceptable to Owner or Engineer/Architect.
 - 5. Evidence of compliance with "Single Installer" requirement.
 - 6. Acceptable field history consists of successful performance of five (5) installations in place over the previous five (5) years under similar project loads, traffic frequency, footprints, and joint sizes. Include sketches, photos, and references for each installation. Installations shall have experienced at least moderate levels of traffic.
 - 7. Vertical and horizontal cyclic load tests shall be performed at an independent laboratory, and witnessed by a professional engineer who shall issue a sealed final report of the test results. Tests shall consist of cyclic load testing using the design criteria in Part 2 and project joint sizes. Tests shall meet the following criteria:
 - a. Vertical load cycle counts shall be a minimum of 2, 1000, and 1,000,000 cycles for the collapse, service, and fatigue level loads respectively.
 - b. Horizontal load cycle counts shall be a minimum of 1,000 and 25,000 cycles for the service and fatigue level loads respectively. No horizontal load test is required for the collapse level loads.
 - c. The vertical service and fatigue load test shall consist of a rolling tire at specified load in order to gauge joint wear. Test specimen shall show no signs of yielding of load carrying elements.
 - d. Observation and testing results of performance for noise mitigation elements shall be reported.
 - e. Different specimens may be used for the tests if they are of the same size and design. Conditions adjacent to the joint, e.g. the blackout region, shall be in keeping with the system design. Test joints shall be not less than 4 feet per tire in length, and shall replicate typical field installed geometry.
 - 8. Seismic load tests shall be performed by an independent laboratory and witnessed by a professional engineer who shall issue a sealed final report of the test results.

Tests shall consist of harmonic cycle testing at seismic velocities and displacements.

- a. Test displacements shall not be less than 85% of the joint's design range, at a frequency not less than 0.5Hz, for not less than 10 cycles.
 - b. Longitudinal displacements (parallel to the joint) shall be 10% of the transverse displacement (perpendicular to the joint), but not less than 1", for joints where only unidirectional movement is expected, and 50%, but not less than 1", for joints in which bidirectional movement is anticipated. Longitudinal and transverse displacements shall be applied simultaneously with a vertical offset of ½" between opposite sides of the joint.
 - c. Seismic testing is not required for small movement joints with seismic design displacements of less than 2" (+/-2", 4" total).
- B. Installer Qualifications: An employer of workers, including superintendent for this project, trained and approved by manufacturer.
- C. Testing Agency: Independent testing laboratory employed by **Owner** and acceptable to Engineer/Architect.
- D. Certifications
1. Materials shall be compatible with materials or related Work with which they come into contact and the related materials sections.
 2. Manufacturer/Applicator: Review and approve all details before construction. Confirm in writing to Owner.

1.9 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials to site in original, unopened containers, bearing following information:
1. Name of product.
 2. Name of manufacturer.
 3. Date of preparation.
 4. Lot or batch number.
- B. Store materials under cover and protect from weather. Replace packages or materials showing any signs of damage with new material at no additional cost to Owner.

1.10 WARRANTY

- A. Warranty period shall be a 5 year Joint and Several Warranty commencing with date of acceptance of work.
- B. Installation Requirements: Include a written plan of construction and coordination requirements, to allow joint system installation to proceed with specified warranty, that specifically addresses the following:

1. Block out acceptance criteria.
 2. Surface preparation acceptance criteria.
 3. Crack, surface defect, and detailing recommendations.
 4. Method of protection of surrounding surfaces.
 5. Method of expansion joint system installation description.
 6. Primer type and application rate.
 7. Method of preparation of all glands and reinforced membranes.
 8. Temperature, humidity and other weather constraints. Specify substrate moisture testing criteria, if any.
 9. Final cure time before removal of protection, resumption of traffic, and/or paint striping.
 10. Any other special instructions required to ensure proper installation.
- C. Quality Service Requirements: Show evidence of licensed/approved installer. List of names, addresses and phone numbers, with copies of certification/approval agreement with each, satisfies requirement. Licensing/certification agreement shall include following information:
1. Installer's financial responsibility for warranty burden under agreement terms.
 2. Manufacturer's financial responsibility for warranty burden under agreement terms.
 3. Process for dispute settlement between manufacturer and installer in case of system failures where cause is not evident or cannot be assigned.
 4. Authorized signatures for both Installer Company and Manufacturer.
 5. Commencement date of agreement and expiration date (if applicable).
 6. Provide copy of contractor's field application quality control procedures.
- D. Manufacturer: Furnish Owner with written total responsibility Joint and Several Warranty, detailing responsibilities of manufacturer and installer with regard to warranty requirements (Joint and Several). The warranty shall provide that expansion joints will be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of: Warranty shall provide that system shall be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of:
1. Any water leakage through expansion joint system or leaking conditions of reinforced membrane, other waterproofing components, or glands.
 2. Any adhesive or cohesive failures of the system.
 3. Shifting of plates out of alignment due to system failure.
 4. Loose plates, anchor blocks, bolts.
 5. Metal to metal vibration causing noises during use.
 6. Metal to non-metal vibration causing noises during use.
 7. Tears, weathering, or degradation in gland from normal use.
 8. Expansion joint glands are considered defective if they buckle upwards beyond the level of the floor surface after installation or downward in excess of ½ inch below the floor surface.
- E. If expansion joint systems or components show any of defects listed above, supply labor and material to repair all defects at no cost to Owner.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. A single Installer shall be responsible for providing complete expansion joint system. Obtain all joint systems through one source from a single manufacturer.
- B. Drawings indicate size, profiles, and dimensional requirements of joint systems and are schematic for systems indicated.
- C. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

2.2 PERFORMANCE REQUIREMENTS

- A. Intent of this section is to insure that installed expansion joints allow pedestrian and vehicular traffic to pass in a smooth, quiet fashion with minimal maintenance required over a period of not less than 10 years. Expansion joints shall not only function as structural bridging elements, but must also accommodate structural expansions/contractions and minimize water leakage.
- B. Provide design of expansion joint for preparation of final details for fabrication and construction of all concrete openings, expansion joint elements and required accessories. An integral part of this project is engineering for the following:
 - 1. Include calculations for the size and forming of concrete openings to provide nominal joint width as indicated on drawings. Provide a summary of the design criteria used in the design.
 - 2. Include calculations for the appropriate size of expansion joint elements in accordance with the expansion joint assembly performance criteria. Include installation requirements of expansion joint assembly for specific project conditions and scheduling. Provide a summary of design criteria used in design.
- C. Expansion joint design shall meet or exceed all expected movements shown on drawings.
- D. Installation temperature range and estimated volume change movements are shown on drawings. Nominal form width shown on the drawings shall be adjusted for the ambient temperature at time of concrete placement and designer shall verify that width of joint at installation shall meet minimum installation requirements.
- E. Expansion joint systems shall be capable of resisting a differential vertical movement of **½ inch**.
- F. Materials shall be supplied in lengths to minimize or eliminate the need to splice waterproofing components.
 - 1. Waterproofing materials directly exposed to vehicular traffic shall be supplied with no joints in vehicle drive aisles.
 - 2. All mitered splices shall be performed at the factory and provide sufficient gland length for butt splicing with field splicing equipment.

3. All Santoprene butt to butt splices shall be heat welded.
 4. Butt to butt splices with other materials shall be per manufacturer's recommendations.
- G. Design system for passenger vehicles traveling at speeds normally expected within a parking structure.
- H. Walking Surfaces: Expansion joint assemblies at walking areas subject to pedestrian traffic shall provide a smooth, slip resistant walking surface for pedestrians with these minimum requirements:
1. Shall provide walking surfaces in accordance with ASTM – F 1637 Standard Practice for Safe Walking Surfaces.
 2. Shall be designed to comply with “Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)” and ICC A117.1. Americans with Disabilities Accessibility Guidelines for Buildings and Facilities, as published by U.S. Architectural & Transportation Barriers Compliance Board, 1331 F Street, N.W., Suite 1000, Washington, DC 20004-1111. 1-800-872-2253.
 3. Adjoining walkway surfaces shall be flush and meet the following minimum requirements:
 - a. Changes in level of less than $\frac{1}{4}$ inch in height may be without edge treatment as shown in ADA Figure 303.2 and on the Drawings.
 - b. Changes in Level between $\frac{1}{4}$ inch and $\frac{1}{2}$ inch in height shall be beveled with a slope no greater than 1:2 as shown in ADA Figure 303.3 and on the Drawings.
 - c. Changes in level greater than $\frac{1}{2}$ inch in height are not permitted unless they can be transitioned by means of a ramp as shown on Drawings.
 - d. Openings in floor or ground surfaces shall not allow passage of a sphere more than $\frac{1}{2}$ inch diameter except as allowed for elevators and platform lifts as shown in ADA Figure 302.3 and on the Drawings.

2.3 MANUFACTURERS

- A. Subject to compliance with requirements, provide products from one of following manufacturers (listed in alphabetical order), only where specifically named in product categories:
1. Dow Corning Corp., Midland, MI (Dow Corning).
 2. Emseal Joint Systems, Westborough, MA (Emseal).
 3. Erie Metal Specialties, Inc., Akron, NY (EMS).
 4. Lymtal International Inc. Lake Orion, MI (Lymtal).
 5. MM Systems Corporation, Atlanta, GA (MM).
 6. Tremco, Cleveland, OH (Tremco).
 7. Watson Bowman Acme Corporation, a Division of BASF Construction Chemicals NA, Amherst, NY (WBA).

2.4 PRODUCTS, STANDARD EXPANSION JOINT SYSTEMS

- A. Elastomeric concrete edged, extruded rubber expansion joint system. (All parking floor levels)**
1. Polycrete/Membrane System, Type CR Series, EMS.
 2. Thermaflex Membrane/Nosing System, Type TM and TCR Series, Emseal.
 3. Vulkem WF series Vehicular Expansion Joint System, Tremco.
 4. Wabo®Crete Membrane System ME Series, WBA.
- B. Adhered extruded rubber expansion joint sealant system.(Limited to use as isolation joint seals at stairway landings, and grade level approach slab)**
1. Epoxy Bonded Sealing System, EBS Series, MM.
 2. Iso-Flex Pressure Lok, Q Series, LymTal.
 3. Jeene® Structural Sealing Joint System, WBA.
 4. TechStar W-Seal; neoprene, TechStar.
- C. Substitutions: **None** for this project. Contact Engineer/Architect for consideration for future projects.**
- D. Expanding foam sealants: For use al Stairtower to floor Isolation joints)**
1. 1200 Series Foam Seal, Jointmaster.
 2. ColorJoint Silicone Sealing System, ESS Series, MM.
 3. Horizontal Colorseal, Emseal.
 4. Iso-Flex Precom "C", LymTal.
 5. Wabo Seismic WeatherSeal, WBA.

EXECUTION

2.5 EXAMINATION

- A. Examine surfaces and blockouts where expansion joint systems will be installed for installation tolerances and other conditions affecting performance of Work.**
- B. Check elevations on each side of expansion joint gap to ensure flush slab-to-slab transition.**
- C. Check anticipated or actual minimum and maximum joint openings. Compare to manufacturer's movement specifications and make joint sizing recommendations.**
- D. Coordinate and verify that related Work meets following requirements:**
1. Check adhesion to substrates and recommend appropriate preparatory measures.
 2. Curing compounds used on concrete surfaces are compatible with Work to be installed.
 3. Concrete surfaces have completed proper curing period for system selected.
 4. Coordinate expansion joint system with other related Work before installation of expansion joint.
 5. Verify expansion joints are compatible with Joint Sealants and traffic toppings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.**

- F. Cease installation if expansion joint blockouts and/or openings exhibit cracked edges, voids or spalls. Repair with approved material prior to installation of expansion joint.
- G. Correct unsatisfactory conditions in manner acceptable to Manufacturer and Engineer before installing joint system.

2.6 PREPARATION

- A. Prepare for installation of expansion joint systems in accordance with manufacturer's recommendations
- B. Surface Preparation:
 - 1. Acid etching: Prohibited.
 - 2. Prepare substrates according to joint system manufacturer's written instructions.
 - 3. Clean joints thoroughly in accordance with manufacturer's instructions to remove all laitance, unsound concrete and curing compounds which may interfere with adhesion.

2.7 INSTALLATION

- A. Comply with manufacturer's written instructions for storing, handling, and installing joint assemblies and materials unless more stringent requirements are indicated.
- B. Proceed with work only when existing and forecast weather and temperature of concrete substrate will permit work in accordance with manufacturer's recommendations.
- C. Cease material installation under adverse weather conditions, or when temperatures are outside manufacturers recommended limitations for installation, or when temperature of work area or substrate are below 40°F.
- D. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.
- E. Seal all openings to occupied spaces to prevent cleaning materials, solvents and fumes from infiltration. All protective measures and/or ventilating systems required to prevent infiltration are incidental to this Work.
- F. Clean off excess material and material smears adjacent to joints as work progresses using methods and materials approved by manufacturer.

2.8 FIELD QUALITY CONTROL

- A. Field Tests and Inspections: Prior to opening to traffic, test joint seal for leaks by maintaining continuously wet for 12 hours. Repair leaks revealed by examination of seal underside. Repeat test and repairs until all leaks stopped for full 12 hours.

- B. Manufacturer Services: Provide qualified manufacturer's technical representative for periodic inspection of Work at critical time of the installation, including but not limited to pre-concrete formwork and placement site meetings, block out inspection, surface defect repair, surface preparation, metal work, expansion gland installation and waterproofing system installation.

2.9 PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.
- B. Protect installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of Work.

END OF SECTION 07 95 00

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SECTION 08 11 13 – 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. This Section includes the following:
 - 1. Steel doors and frames.
- B. Related Sections include the following:
 - 1. Division 02 Section "Work Items."
 - 2. Division 08 Section "Door Hardware" for door hardware and weather stripping.
 - 3. Division 09 Section "Exterior Painting."

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Product Data: For each type of door and frame indicated, include door designation, type, level and model, material description, core description, construction details, label compliance, sound and fire-resistance ratings, and finishes.
- B. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- C. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.5 QUALITY ASSURANCE

- A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

- B. Inspect door and frame on delivery for damage and notify shipper and supplier if damage is found. Minor damages may be repaired provided refinished items match new work and are acceptable to Engineer/Architect. Remove and replace damaged items that cannot be repaired as directed.
- C. Store door and frame at building site under cover. Place units on minimum 4-inch- high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If door packaging becomes wet, remove cartons immediately.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Amweld International, LLC.
 - 2. Apex Industries, Inc.
 - 3. Ceco Door Products; an Assa Abloy Group company.
 - 4. Commercial Door & Hardware Inc.
 - 5. Concept Frames, Inc.
 - 6. Curries Company; an Assa Abloy Group company.
 - 7. Custom Metal Products.
 - 8. Daybar.
 - 9. Deansteel.
 - 10. DKS Steel Door & Frame Sys. Inc.
 - 11. Door Components, Inc.
 - 12. Fleming-Baron Door Products.
 - 13. Gensteel Doors Inc.
 - 14. Greensteel Industries, Ltd.
 - 15. HMF Express.
 - 16. Hollow Metal Inc.
 - 17. Hollow Metal Xpress.
 - 18. J/R Metal Frames Manufacturing, Inc.
 - 19. Karpen Steel Custom Doors & Frames.
 - 20. L.I.F. Industries, Inc.
 - 21. LaForce, Inc.
 - 22. Megamet Industries, Inc.
 - 23. Mesker Door Inc.
 - 24. Michbi Doors Inc.
 - 25. MPI Group, LLC (The).
 - 26. National Custom Hollow Metal.
 - 27. North American Door Corp.
 - 28. Philipp Manufacturing Co (The).
 - 29. Pioneer Industries, Inc.
 - 30. Premier Products, Inc.
 - 31. Republic Doors and Frames.
 - 32. Rocky Mountain Metals, Inc.
 - 33. Security Metal Products Corp.
 - 34. Shanahans Manufacturing Ltd.
 - 35. Steelcraft; an Ingersoll-Rand company.

36. Steward Steel; Door Division.
37. Stiles Custom Metal, Inc.
38. Titan Metal Products, Inc.
39. Trillium Steel Doors Limited.
40. West Central Mfg. Inc.
41. Or Engineer approved equal

2.2 REGULATORY REQUIREMENTS

- A. Fire-Rated Assemblies: Complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
 1. Smoke- and Draft-Control Assemblies: Provide an assembly with gaskets listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing according to UL 1784 and installed in compliance with NFPA 105.
- B. Fire-Rated, Borrowed-Light Assemblies: Complying with NFPA 80 and listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9.

2.3 HOLLOW-METAL DOORS AND FRAMES

- A. Construct doors and frames to comply with the standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.
- B. Extra-Heavy-Duty Doors and Frames: SDI A250.8, Level 3.
 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 (44.5 mm.)
 - c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.
 - d. Core: Manufacturer's standard kraft-paper honeycomb, polystyrene, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core at manufacturer's discretion.
 - e. Preinstalled 6"x27" Vision Lite w/Clear Tempered Glass.
 3. Frames:
 - a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch (1.3 mm), with minimum A40 (ZF120) coating.

2.4 FRAME ANCHORS

- A. Jamb Anchors:

1. Post-installed Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.
- B. Floor Anchors: Formed from same material as frames, minimum thickness of 0.042 inch (1.0 mm), and as follows:
 1. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (51-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.5 MATERIALS

- A. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B.
- B. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

2.6 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: Provide beveled or square edges at manufacturer's discretion.
 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. 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.
 1. Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
 2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 3. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.

4. Floor Anchors: Weld anchors to bottoms of jambs with at least four spot welds per anchor; however, for slip-on drywall frames, provide anchor clips or countersunk holes at bottoms of jambs.
5. Jamb Anchors: Provide number and spacing of anchors as follows:
 - a. Masonry Type: Locate anchors not more than 16 inches (406 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c., to match coursing, and as follows:
 - 1) Four anchors per jamb.
- 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 non-templated, 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.
- F. Stops and Moldings: Provide stops and moldings around glazed lites and louvers where indicated. Form corners of stops and moldings with hairline joints.

2.7 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.
 2. Finish Coat: Paint for new doors and frames shall be as specified in Section "Exterior Painting." Color to be specified by Owner.

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.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

- D. Proceed with installation only after unsatisfactory conditions have been corrected.

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.
- B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

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. Remove temporary braces necessary for installation only after frames have been properly set and secured.
 - b. Check plumb, square, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
 - c. Field apply bituminous coating to backs of frames that will be filled with grout containing anti freezing agents.
 - 2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
 - 4. In-Place Concrete or Masonry Construction: Secure frames in place with post installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 5. 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 (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

- C. Hollow-Metal Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.
 - 1. Between Door and Frame Jambs and Head: 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).
 - 2. At Bottom of Door: 3/4 inch (19.1 mm) plus or minus 1/32 inch (0.8 mm).
 - 3. Between Door Face and Stop: 1/16 inch (1.6 mm) to 1/8 inch (3.2 mm) plus or minus 1/32 inch (0.8 mm).

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 08 11 13

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SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, except special types of unique hardware specified in the same Sections as doors and door frames on which they are installed.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 02 Section "Work Items."
 - 2. Division 08 Section "Hollow Metal Doors and Frames."
 - 3. Division 09 Section "Exterior Painting."

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. hardware submittal to be coordinated with door and frame and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Based on hardware indicated, organize schedule into "hardware sets" indicating complete designations of every item required for the door assembly. Include the following information:
 - a. Type, style, function, size, and finish of each hardware item.
 - b. Name and manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - e. Mounting locations for hardware.
 - f. Door and frame size and materials.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.4 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.
- B. Supplier Qualifications: Recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced architectural hardware consultant (AHC) who is available to Owner, Engineer/Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
 - 1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
- C. Regulatory Requirements: Comply with provisions of the following:
 - 1. All hardware shall comply with accessibility requirements. Use the most restrictive standards of the following codes. Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG," or Local Accessibility Standards as required by the Governing Body.
 - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist. Must operate with a closed fist.
 - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
 - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door..
 - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - c. Thresholds: Not more than ½ inch high. Bevel raised thresholds with a slope of not more than 1:2.
 - 2. NFPA 101: Comply with the following for means of egress doors:
 - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
 - b. Door Closers: Not more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.
 - c. Thresholds: Not more than ½ inch high.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

1.5 PRODUCT HANDLING

- A. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).

1.6 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 (3) years from date of Substantial Completion, unless otherwise indicated.

1.7 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 HINGES

- A. Hinges: BHMA A156.1
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Bommer Industries, Inc.
 - c. Cal-Royal Products, Inc.
 - d. Hager Companies.
 - e. IVES Hardware; an Ingersoll-Rand company.
 - f. Lawrence Hardware Inc.
 - g. McKinney Products Company; an ASSA ABLOY Group company.
 - h. PBB, Inc.
 - i. Stanley Commercial Hardware; Div. of The Stanley Works.

2.2 MECHANICAL LOCKS AND LATCHES

- A. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

2.3 EXIT DEVICES AND AUXILIARY ITEMS

- A. Exit Devices and Auxiliary Items: BHMA A156.3.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Von Duprin; an Ingersoll-Rand company.
 - b. Engineer Approved Equal

2.4 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, provide products by one of the following:
 - a. LCN Closers; an Ingersoll-Rand company.
 - b. Engineer Approved Equal

2.5 DOOR GASKETING

- A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) 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. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.
 - d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - e. Reese Enterprises, Inc.
 - f. Sealeze; a unit of Jason Incorporated.
 - g. Zero International

2.6 THRESHOLDS

- A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. M-D Building Products, Inc.
 - c. National Guard Products.
 - d. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
 - e. Reese Enterprises, Inc.
 - f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
 - g. Sealeze; a unit of Jason Incorporated.
 - h. Zero International.

2.7 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Baldwin Hardware Corporation.
 - b. Cal-Royal Products, Inc.
 - c. Don-Jo Mfg., Inc.
 - d. Hager Companies.
 - e. Rockwood Manufacturing Company.
 - f. Stanley Commercial Hardware; Div. of The Stanley Works.
 - g. Trimco.

2.8 DOOR SHOES

- A. Door Shoe: ANSI/BHMA 156.18; Minimum 3-1/2" high; Extruded tempered aluminum 6063-T6; with resilient or flexible vinyl 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. Hager Companies.

2.9 KICK PLATES

- A. Kick Plates: Rockwood Manufacturing K1050 with US32D Stainless Steel Satin Finish. Height of the kick plate shall be 24" with countersunk holes.

2.10 MATERIALS AND FABRICATION

- A. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI/BHMA A156 series standards for each type of hardware item and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- B. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- C. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

2.11 HARDWARE FINISHES

- A. Provide stainless steel door hinges and push-pull latch/lever.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount hardware units at heights indicated in following applicable publications, except as specifically indicated or required to comply with governing regulations and except as otherwise directed by Engineer/Architect.
 - 1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- C. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- D. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.2 ADJUSTING, CLEANING, AND DEMONSTRATING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

- B. Clean adjacent surfaces soiled by hardware installation.

END OF SECTION 08 71 00

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SECTION 09 91 13 - EXTERIOR PAINTING

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 surface preparation and the application of paint systems on exterior substrates
 - 1. Concrete masonry units (CMUs).
 - 2. Steel doors .
 - 3. Galvanized metal.
 - 4. Painting Fire Protection Standpipe
- B. Related Requirements:
 - 1. [Division 05, Section "Metal Fabrications" for shop priming metal fabrications.

1.3 DEFINITIONS

- A. MPI Gloss Level 4 ('Satin-Like' Finish): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.
- B. MPI Gloss Level 5 (Semi-Gloss): 35 to 70 units at 60 degrees, according to ASTM D 523.
- C. MPI Gloss Level 6 (Gloss): 70 to 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Sustainable Design Submittals:
 - 1. Product Data: For paints and coatings, indicating VOC content.
- C. Samples for Initial Selection: For each type of topcoat product.

- D. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- E. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Paint: **5** percent, but not less than 1 **gal.** of each material and color applied.

1.6 QUALITY ASSURANCE

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F .
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. Dunn-Edwards Corporation.

3. Kelly-Moore Paint Company Inc.
4. PPG Architectural Finishes, Inc.
5. Pratt & Lambert.
6. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- C. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
 1. Flat Paints and Coatings: 50 g/L.
 2. Nonflat Paints and Coatings: 50 g/L.
 3. Primers, Sealers, and Undercoaters: 100 g/L.
 4. Rust-Preventive Coatings: 100 g/L.
 5. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 6. Pretreatment Wash Primers: 420 g/L.
- D. Colors: As selected by Architect from manufacturer's full range of samples

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 1. Concrete: 12 percent.
 2. Masonry (Clay and CMUs): 12 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.
- F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer. but not less than the following:
 - 1. SSPC-SP 3.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.

5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- C. Painting Fire Protection Standpipe

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Concrete Substrates, Non-traffic Surfaces:
1. Latex System MPI EXT 3.1A:
 - a. Prime Coat: Primer, alkali resistant, water based, MPI #3.
 - 1) Benjamin Moore; Ultra Spec - Masonry Int/Ext 100 Acrylic Sealer.
 - 2) Sherwin-Williams; Loxon - Loxon Concrete & Masonry Primer.

- 3) PPG Architectural; PPG Paints – Seal Grip Int/Ext Acrylic Universal Primer/Sealer.
- 4) Equivalent products by other manufacturers and approved by Architect/Engineer.

b. Topcoat: Latex, exterior, flat (MPI Gloss Level 1), MPI #10.

- 1) Benjamin Moore; Ultra Spec – Exterior Flat Finish.
- 2) Sherwin-Williams; SuperPaint – Exterior Latex Flat.
- 3) PPG Architectural; PPG Paints – Ultra-Hide 150 Exterior Acrylic Flat.
- 4) Equivalent products by other manufacturers and approved by Architect/Engineer.

B. CMU Substrates:

1. Latex System MPI EXT 4.2A:

a. Prime Coat: Block filler, latex, interior/exterior, MPI #4.

- 1) Benjamin Moore; Ultra Spec - Int/Ext High-Build Masonry Block Filler.
- 2) Sherwin-Williams; PrepRite – Int/Ext Block Filler.
- 3) PPG Architectural; PPG Paints - Speedhide Int/Ext. Masonry Hi Fill Latex Block Filler.
- 4) Equivalent products by other manufacturers and approved by Architect/Engineer.

b. Topcoat: Latex, exterior, low sheen (MPI Gloss Level 3-4), MPI #15.

- 1) Benjamin Moore; Ultra Spec - Exterior Satin Finish.
- 2) Sherwin-Williams; SuperPaint – Exterior Latex Satin.
- 3) PPG Architectural; PPG Paints - Speedhide Exterior 100% Acrylic Latex Satin.
- 4) Equivalent products by other manufacturers and approved by Architect/Engineer.

C. Steel and Iron Substrates:

1. Alkyd System MPI EXT 5.1D:

a. Prime Coat: Primer, alkyd, anticorrosive, for metal, MPI #79.

- 1) Benjamin Moore; Super Spec HP – Alkyd Metal Primer.
- 2) Sherwin-Williams; Protective & Marine - Kem Kromik Universal Primer.
- 3) Equivalent products by other manufacturers and approved by Architect/Engineer.

b. Topcoat: Alkyd, exterior, gloss (MPI Gloss Level 6), MPI #9.

- 1) Benjamin Moore; Corotech - Alkyd Gloss Enamel.
- 2) Sherwin-Williams; Protective & Marine - Seaguard 1000 Marine.

- 3) Equivalent products by other manufacturers and approved by Architect/Engineer.

A. Galvanized-Metal Substrates:

1. Latex System MPI EXT 5.3H:

- a. Prime Coat: Primer, galvanized, water based, MPI #134.

- 1) Behr Paint; Premium Plus - Exterior Multi-Surface Primer & Sealer.
- 2) Sherwin-Williams; Pro Industrial - DTM Acrylic Primer/Finish
- 3) Equivalent products by other manufacturers and approved by Architect/Engineer.

- b. Intermediate Coat: Latex, exterior, matching topcoat.

- c. Topcoat: Latex, exterior, gloss (MPI Gloss Level 6), MPI #119.

- 1) Behr Paint; Behr Plus - Int/Ext Hi-Gloss Enamel.
- 2) Sherwin-Williams; Pro Industrial – DTM Acrylic Gloss
- 3) Equivalent products by other manufacturers and approved by Architect/Engineer.

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SECTION 09 91 21 - PAVEMENT MARKING - RESTORATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Contract 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. This Section includes surface preparation and application of high build paint systems to replace existing for the items of types, patterns, sizes, and colors described in this article.
- B. Provide the following systems as shown on Drawings:
 - 1. Parking Stall Stripes.
 - 2. Traffic Arrows, crosswalks, accessible stall access aisles, walkways, symbols.
 - 3. International Symbol of Accessibility.
- C. Provide painting of curbs and curb ramps as described in the following paragraphs:
 - 1. Paint vertical surface and the first 6 in. of the abutting horizontal surface at the top of all curbs and islands (including PARCS equipment islands) within parking facility to match existing, unless otherwise noted on the Drawings.
 - 2. Paint color for curbs and curb ramps shall be yellow.
- D. Proportion International Symbol of Accessibility in accordance with ICC A117.1-2009 Accessible and Usable Buildings or 2010 ADA Standards for Accessible Design.
- E. Related Work:
 - 1. Pavement Marking Contractor shall verify compatibility with sealers, joint sealants, caulking and all other surface treatments as specified in Division 07.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Provide product data as follows:
 - 1. Manufacturer's certification that the material complies with standards referenced within this Section.
 - 2. Intended paint use.
 - 3. Pigment type and content.
 - 4. Vehicle type and content.

- C. Submit list of similar projects (minimum of 5) where pavement-marking paint has been in use for a period of not less than 2 yrs.
- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.4 PROJECT CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees F.
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F above the dew point; or to damp or wet surfaces.

1.5 QUALITY ASSURANCE

- A. Provide written 1 year warranty to Owner that pavement markings will be free of defects due to workmanship, inadequate surface preparation, and materials including, but not limited to, fading and/or loss of markings due to abrasion, peeling, bubbling and/or delamination. Excessive delamination, peeling, bubbling or abrasion loss shall be defined as more than 15% loss of marking material within one year of substantial completion and/or occupancy of the parking area. With no additional cost to Owner, repair and/or recoat all pavement marking where defects develop or appear during warranty period and all damage to other Work due to such defects.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Pavement marking materials shall meet Federal, State and Local environmental standards.
- B. Paint shall be manufactured and formulated from first grade raw materials and shall be free from defects or imperfections that might adversely affect product serviceability.
- C. Paints shall comply with the National Organic Compound Emission Standards for Architectural Coatings, Environmental Protection Agency, 40 CFR Part 59.
- D. The product shall not contain mercury, lead, hexavalent chromium, or halogenated solvents.

- E. Low VOC - Solvent based paint may be employed for white and yellow pavement markings and shall meet the requirements of MPI #32 (**Floor applications with Traffic Coating, and Floor Sealer**)
1. Available Products: Subject to compliance with the requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - a. Chlorinated Rubber Traffic & Zone Marking Paint, 7493/7494, by RAE Products & Chemicals Corporation
 - b. Setfast Low VOC Acrylic Marking Paint, TM 5626/5627 by Sherwin Williams Company
- F. 100% acrylic waterborne - paint shall be used for white and yellow pavement markings and shall meet requirements of MPI #70. (**Pavement on Grade level**)
1. Available Products: Subject to compliance with the requirements, products that may be incorporated into the Work include, but are not limited to the following:
 - a. Hi-Build Latex "Liquid Thermoplastic" Traffic & Zone Marking Paint, 5430/5431, by RAE Products & Chemicals Corporation
 - b. Setfast Acrylic Waterborne Marking Paint, TM 226/227 by Sherwin Williams Company
 2. 100% acrylic waterborne paint for special color pavement markings (blue, green, red, black) shall meet requirements of Federal Specification TT-P-1952E. Special color marking materials shall be compatible with the white and yellow pavement markings where they are layered.
- G. All products shall have performance requirements of Type I and II of Federal Standard TT-P-1952E.

2.2 COLOR OF PAINT

- A. Color of paint shall match existing, unless noted otherwise on Contract Drawings:
1. White: Match federal color chip 37925 and daylight directional reflectance (without glass beads) shall not be less than 84% (relative to magnesium oxide) when tested in accordance with Federal Test Method Standard 141, Method 6121.
 2. Yellow: Match federal color chip No. 33538. Color shall have daylight directional reflectance (without glass beads) of not less than 50% (relative to magnesium oxide) when tested in accordance with Federal Test Method Standard 141, Method 6121.
 3. Blue: Match federal color chip No. 35180. Color shall have daylight directional reflectance (without glass beads) of not less than 52% (relative to magnesium oxide) when tested in accordance with Federal Test Method Standard 141, Method 6121.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.
- B. Document the location of existing striping and traffic marking, and colors utilized prior to removal of traffic lines and markings for surface preparation.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.
 - 1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.
- E. Striping shall not be placed until full cure of concrete repairs, sealers or coatings. Sealers (other than silane) generally require 14 days @ 70°F or higher. Silane sealers require 24 hrs @ 70°F or higher. Bituminous surfaces generally require 30 days @ 45° F or higher. Coatings shall be fully cured

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Do not paint or finish any surface that is wet or damp.
- C. Clean substrates of substances that could impair bond of paints, including dirt, dust, oil, grease, release agents, curing compounds, efflorescence, chalk, and incompatible paints and encapsulants.
- D. Concrete Substrates: Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
- E. Lay out all striping on each tier, using existing layout, dimensions and details unless otherwise noted on Contract Drawings.
- F. Report any discrepancies, interferences or changes in striping due to field conditions to Engineer/Architect prior to painting. Pavement Marking Contractor shall be required to remove paint, repair surface treatment and repaint stripes not applied in strict accordance with Contract Drawings.
- G. Where existing painted pavement markings and/or stripes conflict with new striping layout or must be removed due to installation which does not conform to contract requirements, remove existing paint markings, using care to avoid scarring substrate surface.

1. Concrete and asphalt surfaces: Material shall be removed by methods acceptable to Engineer/Architect and cause as little damage as possible to surface texture of pavement. Methods, that can provide acceptable results, are grinding and air or shot blasting. Use of chemicals to remove pavement markings prohibited. Collect residue generated by removal of pavement markings and dispose of as required by all applicable laws and regulations. If grinding is used, lightly grind floor surface using wheel mounted floor grinder or similar equipment with positive elevation control of grinder head. For all removal techniques: On test area, demonstrate to Owner acceptable removal of paint material and control of paint removal equipment to prevent substrate scarring.
2. Traffic Topping/Membrane surfaces: Remove existing pavement markings by solvent washing or high-pressure water washing. Submit letter from traffic topping/membrane manufacturer certifying that solvents and/or water pressures are acceptable for this use and will not damage material. On test area, demonstrate to Owner acceptable removal of paint material and control of paint removal equipment to prevent substrate scarring.
3. Contractor shall not use paint, bituminous bond coat or other methods of covering markings to obliterate existing pavement markings.
4. Material deposited on pavement as a result of removal shall be removed as work progresses. Accumulation of material, that might interfere with drainage or might constitute a hazard to traffic, prohibited.
5. Curing compounds on new concrete surfaces (less than 1 yr old) shall be removed per existing pavement marking removal requirements prior to installation of new pavement markings.

H. Work Areas:

1. Store, mix and prepare paints only in areas designated by Contractor for that purpose.
2. Provide clean cans and buckets required for mixing paints and for receiving rags and other waste materials associated with painting. Clean buckets regularly. At close of each day's Work, remove used rags and other waste materials associated with painting.
3. Take precautions to prevent fire in or around painting materials. Provide and maintain appropriate hand fire extinguisher near paint storage and mixing area.

I. Mixing:

1. Do not intermix materials of different character or different manufacturer.
2. Do not thin material except as recommended by manufacturer.

J. Disposal:

1. Contractor shall properly dispose of unused materials and containers in compliance with Federal Resource Conservation Recovery Act (RCRA) of 1976 as amended, and all other applicable laws and regulations.

3.3 APPLICATION

Apply painting and finishing materials in accordance with manufacturer's directions. Use applications and techniques best suited for material and surfaces to which applied. Minimum air shall be used to prevent overspray. Temperature during application shall be minimum of 40° F and rising, unless manufacturer requires higher minimum temperature. Maximum relative humidity shall be as required by manufacturer.

1. Total wet mil thickness of 0.015 in (minimum).
 2. Total dry film thickness of 0.008 in (minimum).
- B. All lines shall be straight, true, and sharp without fuzzy edges, overspray or non-uniform application. Corners shall be at right angles, unless shown otherwise, with no overlaps. Line width shall be uniform (-0%, +5% from specified width). No excessive humping (more material in middle than at edges or vice versa).
- C. All lines shall be 4-inches wide unless otherwise noted.

END OF SECTION 09 91 21

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SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

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 surface preparation and the application of high-performance coating systems on the following substrates:
 - 1. Exterior Substrates:
 - a. Existing structural steel framing, framing connections, precast connections
 - b. Galvanized metal – (limited application to address surface corrosion).
- B. Related Requirements:
 - 1. Division 09, Section "Exterior Painting" for masonry painting.

1.3 DEFINITIONS

- A. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product indicated.
- C. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Coatings: **5** percent, but not less than 5 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

- A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect will select one surface to represent surfaces and conditions for application of each coating system.
 - a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
 - b. Other Items: Architect will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

- A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. RD Coatings Inc. .
 - 2. Tnemec Inc.
 - 3. Sherwin-Williams
- B. Products: Subject to compliance with requirements, provide product listed in the Exterior High-Performance Coating Schedule or Interior High-Performance Coating Schedule for the coating category indicated.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

- A. MPI Standards: Products shall comply with MPI maintenance repainting manual indicated and shall be listed in its "MPI Approved Products Lists."
- B. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
 - 3. Products shall be of same manufacturer for each coat in a coating system.
- C. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
 - 1. Primers, Sealers, and Undercoaters: 100 g/L.
 - 2. Rust-Preventive Coatings: 100 g/L.
 - 3. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
- D. Colors: As selected by Architect from manufacturer's full range of samples.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.

3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Maintenance Repainting Manual" applicable to substrates and coating systems indicated.
- B. All previously coated surfaces scheduled for painting shall initially be power washed with high pressure, (4,000-5,000psi), washing system equipped with a "zero" oscillating tip and used in a manor to remove loose and peeling existing coating, loose rust and rust scale and soluble surface contamination.
- C. Steel Substrates: Following the washing operations all surfaces for coating shall be cleaned in accordance with SSPC SP#3 Power Tool Cleaning to bare metal where rust, loose and non-adhering coating and under film corrosion exist. Special cleaning emphasis shall be given to surfaces where intact rust scale exists to remove to Bare Metal.. Clean using methods recommended in writing by paint manufacturer but not less than the following:]
 1. SSPC-SP 7/NACE No. 4.
 2. SSPC-SP 11 at all existing corrosion repair sites shown on drawing.
 3. SSPC-SP 6 Existing painted structural framing
- D. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

- E. Galvanized-Metal Substrates: Remove grease and oil residue and zinc hydroxide staining (efflorescence) from galvanized steel framing by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

3.3 APPLICATION

- A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Maintenance and Repainting Manual."
 - 1. Use applicators and techniques suited for coating and substrate indicated.
 - 2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.
- D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
 - 1. Contractor shall touch up and restore coated surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

- B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

- A. All previously coated surfaces scheduled for painting shall initially be power washed with high pressure, (4,000-5,000psi), washing system equipped with a “zero” oscillating tip and used in a manor to remove loose and peeling existing coating, loose rust and rust scale and soluble surface contamination.
- B. Following the washing operations, all surfaces scheduled for coating shall be cleaned in accordance with SSPC-SP #3 power tool cleaning to bare metal, where rust, rust-scale, loose and non-adhering coating and underfilm corrosion exist. Special cleaning emphasis shall be given to surfaces where intact rust scale exists to remove back to bare metal.
- C. All coatings shall be supplied by RD Coating Inc., local representatives; The Righter Group Inc., Wilmington, MA ((78)988-9500, and be applied in strict accordance with the manufactures date sheets.
- D. Existing Painted Structural Steel Framing Substrates:
 - 1. Primer:
 - a. Prime Coat: Epoxy anticorrosive for metal shall be one full coat of RD Elastometal primer applied to cleaned metal surfaces at a dry film thickness (DFT) of 6.0 – 8.0 mils.
 - 1) RD Elastometal Primer .
 - b. Strip Coat: All leading edges of bolted connections and welds shall be “strip coated” with on coat of Elastometal applied by brush at 3.0 – 5.0 mils (DFT) following the application of the primer
 - 1) RD Elastometal Primer
 - c. Intermediate Coat – Apply on full coat of RD Elastometal applied to all surfaces scheduled for coating at a dry film thickness of 6.0 – 8.0 mild DFT.
 - d. Finish Coat (Topcoat): apply one full coat of RD Monoguard applied to all surfaces scheduled for coating of 3.0 – 5.0 mils DFT.

- e. Alternate color between coating applications to identify completeness of application.

E. Existing Painted Structural Steel Framing Substrates (Option):

All spot locations where heavy corrosion occurs shall be abrasive blast cleaned and shall be prepared in accordance with SSPC-SP6 Commercial Blast Cleaning. All surfaces shall exhibit a uniform profile of 1.5 to 2 mils. All prepared surfaced shall be primed prior to the formation of rust bloom. All remaining surfaces shall be cleaned in accordance with SSPC-SP7 Brush – Off Blast cleaning to remove all loose non-adhering paint and impart a uniform anchor profile on all remaining coating(s) for proper adhesion of the prime coat. All coating work shall be applied in strict accordance with the manufactures date sheets.

F. Coating Schedule::

1. Primer:

- a. Spot Prime Coat: Tnemec Series 1 Omnithane applied at 2.5 – 3.5 mils DFT applied to all bare metal and overlapped two inches onto existing coating..

1) Tnemec Series 1 Omnithane .

- b. Full Intermediate Coat – Apply one full intermediate applied to 6.0 – 8.0 mils DFT.

1) Tnemec Series 135 Chembuild.

- c. Full Finish Coat Apply one full intermediate applied to 2.0 – 3.0 mils DFT.

1) Tnemec Series 1095 Endura-Shield

- d. Alternate color between coating applications to identify completeness of application.

G. Galvanized-Metal Substrates:

This coating application is limited to spot locations showing spot corrosion and salt staining on the galvanized structural framing. Metal surfaces to be coated shall be prepared in accordance with SSPC-SP6 Commercial Blast Cleaning. All surfaces shall exhibit a uniform profile of 1.5 to 2 mils. All prepared surfaced shall be primed prior to the formation of rust bloom. All remaining surfaces shall be cleaned in accordance with SSPC-SP16 Brush-off blast cleaning of galvanized metal to remove loose zinc salts and other foreign contamination and impart a uniform profile of 1.5 to 2.0 mils for proper adhesion of prime coat. All blasted galvanized surfaces shall be primed prior to the reformation of zinc salts. All coating work shall be applied in strict accordance with the manufactures date sheets.

H. Coating Schedule::

1. Primer:
 - a. Spot Prime Coat: Tnemec Series 1 Omnithane applied at 2.5 – 3.5 mils DFT applied to all bare metal and overlapped two inches onto existing surface..
 - 1) Tnemec Series 1 Omnithane .
 - b. Full Intermediate Coat – Apply one full intermediate applied to 3.0 – 5.0 mils DFT.
 - 1) Tnemec Series 135 Chembuild.
 - c. Full Finish Coat Apply one full intermediate applied to 2.0 – 3.0 mils DFT.
 - 1) Tnemec Series 1095 Endura-Shield
 - d. Color to match to existing grey color of galvanized metal.

3.7 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Steel Stair Tower Framing Only:

1. Epoxy System
 - a. Prime Coat: Primer, anti-corrosive, for metal:
 - 1) <Sherman Williams Pro-Industrial Pro-Cryl Primer B66-310 series at 2.5 – 4.0 mils FFT
 - b. Intermediate Coat: Epoxy, matching topcoat.
 - c. Topcoat: Epoxy, Light Industrial coating , semi-gloss:
 - 1) <Sherman Williams Pro Industrial Acrylic Gloss Coating B66-600 series at 2.5 to 4.0 mils DFT

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SECTION 21 05 00 – COMMON WORK RESULTS FOR FIRE SUPPRESSION

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. This Section includes general administrative and procedural requirements for mechanical installations. Following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 01:
 - 1. Submittals.
 - 2. Record documents.
 - 3. Mechanical installations.
 - 4. Cutting and patching.
 - 5. Testing/Guarantee
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 21, plus general related specifications including:
 - a. Access to mechanical installations.
 - b. Excavation for mechanical installations within the building boundaries, and from building to utilities connections.
- C. Definitions:
 - 1. Term "Contractor" used throughout Division 21 shall mean Mechanical Subcontractor.
 - 2. Term "provide" shall mean to furnish all necessary labor, materials, equipment, accessories, transportation, services, installation and adjustment under Contract amount, including Contractor's profit, overhead and payment of all taxes and fees.

1.3 SUBMITTALS

- A. General: Follow the procedures specified in Division 01 Section "Submittal Procedures" and as specified in this Section.
- B. Shop Drawings and Catalog Sheets. Include:
 - 1. Standpipe fire line layout and components.
 - 2. PIV Valves.

3. Support material and hardware.

C. Substitutions:

1. Products are referenced in Specification and on Drawings to establish standard of quality, style, design, and function of materials, equipment, apparatus, or product.
2. There are often several satisfactory substitutes for standardized utilitarian items which satisfy design objectives.
3. Since it is impractical to name all possible brands that might be furnished, substitutes may be proposed unless specifically stated otherwise.
4. Submit substitutions in accordance with Division 01 and General Conditions of Specification and as follows:
 - a. Submit proposed substitute material or equipment to be considered for approval as equivalent to Engineer/Architect at least 7 days before time set for receiving Bids.
 - b. Contractor assumes all engineering and construction costs necessary for revision in Work due to substitute material or equipment.

- D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.

- E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.4 COORDINATION/SCHEDULING/CODES AND STANDARDS

A. Coordination:

1. Visit site before Bidding to note apparent features which may affect Work. No subsequent allowance will be made because of failure to make this examination before Bidding.
2. Verify all dimensions in field before ordering any material or doing any Work.
3. Verify ceiling heights or other architectural and structural details before installing any piping.
4. No extra compensation will be allowed because of differences between actual measurements and dimensions and those indicated on Drawings.
5. Notify Engineer/Architect in writing of any difference which may be found before proceeding with Work.

B. Scheduling:

1. Schedule Work so as to coordinate with other Contractors.
2. Before starting Work, prepare and submit to Prime Contractor schedule of operations outlining proposed order of procedure, giving dates of execution and estimated time required for completion of each step.
3. After schedule has been accepted by Prime Contractor and Engineer/Architect, do not deviate from schedule without written consent of Prime Contractor.

4. No subsequent extras will be allowed for materials and labor not included by Bidder for Mechanical Work due to lack of familiarity with Contract Documents as they relate to Work of all other trades required for Project.
5. Before construction starts, cut off and plug any abandoned existing services at property line. Coordinate with local utility company and civil engineer.
6. Coordinate service connection to meter with local water department and civil engineer.

C. Codes and Standards:

1. Comply with:
 - a. American Welding Society (AWS).
 - b. American Society of Mechanical Engineers (ASME).
 - c. American National Standards Institute (ANSI).
 - d. American Society for Testing and Materials (ASTM).
 - e. American Insurance Association (A.I.A.).
 - f. National Fire Protection Association (NFPA).
 - g. Underwriters' Laboratories, Inc. (UL).
 - h. Manufacturer's Standardization Society of the Valve & Fittings Industry, Inc. (MSS).
 - i. Factory Mutual Research Corp. (FM).
 - j. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - k. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
2. All local, state, and federal rules and regulations.
 - a. International Building Code (IBC):
 - 1) IBC International Building Code.
 - 2) IBC International Mechanical Code.
 - 3) IBC International Fire Prevention Code.
3. Should any change in Drawings and Specifications be required to comply with local regulations, notify Engineer/Architect at least 7 days before time set for receiving Bids. After entering into contract, Contractor will be held to complete all Work necessary to meet local requirements without extra expense to Owner.
4. Maintain a competent superintendent at Project throughout progress of Work and until Work is completed.

1.5 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements in Division 01 Section "Closeout Procedures". In addition to the requirements specified in Division 01, indicate the following installed conditions:
 1. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance

- located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart. Indicate actual inverts and horizontal locations of underground piping.
2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 3. Approved substitutions, contract modifications, and actual equipment and materials installed.
 4. Contract modifications, actual equipment and materials installed.
- B. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located as specified in Division 01 Section "Execution Requirements" to record the locations and invert elevations of underground installations.

1.6 MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with Division 01 Section "Closeout Procedures". In addition to the requirements specified in Division 01, include the following information for equipment items:
1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 4. Servicing instructions and lubrication charts and schedules.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- B. Deliver materials to Project in good condition. Store materials off ground and protected from elements.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 02 through 33 for rough-in requirements.
- C. Drawings are generally indicative of replacement work to be installed at the shown location .
- D. Do not scale Drawings for rough-in Work.

3.2 MECHANICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:
 - 1. Coordinate mechanical systems, equipment, and materials installation with other building components so as not to delay Contractors.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
 - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
 - 6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 - 7. Coordinate connection of mechanical systems with overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 - 8. Install systems, materials, and equipment to conform with approved submittal data to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer/Architect.
 - 9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
 - 10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
 - 11. Install piping to occupy minimum of space. Install parallel and close to walls, ceiling, columns or other members providing proper space for covering or removal of pipes.
 - 12. Coordinate Work to avoid interferences with other trades.
 - 13. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings or valves which may be required. Investigate structural and finish conditions

- affecting this Work. Plan accordingly, furnishing such offsets, fittings and valves as may be required.
14. Review line layout with Engineer/Architect before construction.
 15. In case of conflict between location indicated on floor plan, greater quantity or better quality prevails, subject to approval of Engineer/Architect.
 16. Coordinate all Work specified in this Division with Work of all other trades required for Project.
 17. Notify Engineer/Architect immediately and confirm in writing of any conflict between Mechanical and Structural Drawings.
 18. Finish painting will be done by others.
 19. Any galvanized equipment, material, or hardware that is cut, scratched, field threaded or grooved shall be coated with a Zinc Rich Coating (ZRC or approved equivalent).
 20. In case interferences between Work develop, Engineer/Architect will decide which Work is to be relocated regardless of which was first installed.
 21. Cleanup:
 - a. At completion of Work under this contract, remove from site and dispose of all rubbish and discarded materials and restore disturbed facilities and surfaces.
 - b. Provide entire installation thoroughly free from all oil and grease after successfully completing all tests and before Work is turned over to Owner.

3.3 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Division 01 Section "Execution". In addition to the requirements specified in Division 01, the following requirements apply:
 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
 2. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - a. Uncover Work to provide for installation of improperly scheduled Work.
 - b. Remove and replace defective Work.
 - c. Remove and replace Work not conforming to requirements of the Contract Documents.
 - d. Remove samples of installed Work as specified for testing.
 - e. Install equipment and materials in structures.
 - f. Upon written instructions from the Engineer/Architect, uncover and restore Work to provide for Architect/Engineer observation of concealed Work.
- B. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to removal of mechanical piping, heating units, and trim, and other mechanical items made obsolete by the new Work.
 1. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

2. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
3. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
 - a. Refer to Division 01 Section "Reference Standards and Definitions" for definition of "experienced Installer".
4. Respective trades will provide openings in floors, walls, and other members as required for installation of piping and equipment, provided that necessary information regarding such openings is furnished by contractor in timely manner.
5. If contractor fails to provide information regarding required openings, cutting and repairing of completed Work will be performed by respective trades at expense of contractor.
6. Seal all such openings in accordance with Division 07 Section "Concrete Joint Sealants."

3.4 TESTING AND GUARANTEE

A. Testing:

1. Take out all necessary permits, arrange for all required inspections, and pay all fees and expenses associated with performing Mechanical Work.
2. Test all piping systems at full operating pressure under normal conditions of use in accordance with requirements of Water Department, Board of Health, Fire Department, and all other authorities having jurisdiction. As a minimum, the water supply system shall be tested at 125 psi for 4 hrs, the sewer system at 5 psi for 15 minutes, natural gas at 100 psi for 2 hours, and the standpipe system at 225 psi for 2 hrs.
3. Provide all instruments for making tests.
4. Perform tests on following systems:
 - a. Standpipe System.
5. Test all parts of system in presence of Contractor, Engineer/Architect, Owner and Authority having jurisdiction for sufficient period of time to permit complete examination and inspection.
6. Successfully test all concealed piping before its being permanently covered up.
7. Remedy all defects in materials or workmanship which appear during test or retest of system.

B. Guarantee:

1. In addition to any specific guarantee called for by Specifications, furnish to Owner written guarantee against defects in materials, workmanship for all apparatus and materials furnished, and for entire workmanship of installation for period of 1 yr from date of acceptance of Work.
2. During guarantee period and without expense to Owner, repair all defects in workmanship or material provided under this Section.

END OF SECTION 21 05 00

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SECTION 21 12 00 - FIRE-SUPPRESSION STANDPIPES

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. This Section specifies Fire Protection Systems for buildings and structures.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 21 Sections "Common Work Results for Fire Suppression".

1.3 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI/AWWA C11/A21.11, "Specification for Ductile Iron Pipe Joints".
 - 2. ANSI/AWWA C151/A21.51, "Specification for Ductile Iron Pipe".
 - 3. ANSI/AWWA C153/A21.53, "Specification for Ductile Iron Pipe Fittings".
- B. Factory Mutual Research Corp. (FM):
- C. National Fire Protection Association (NFPA):
 - 1. NFPA 14, "Standard for the Installation of Standpipe and Hose Systems".
- D. Underwriters' Laboratories, Inc. (UL):
- E. International Code Council, Inc. (IBC)
 - 1. The International Building Code.
 - 2. The International Fire Code.

1.4 DEFINITIONS

- A. Pipe sizes used in this Section are nominal pipe size (NPS) specified in inches. Tube sizes are standard tube size specified in inches.
- B. Other definitions for fire protection systems are included in referenced NFPA standards.

1.5 SYSTEM DESCRIPTIONS

- A. Manual Dry-Type, Class I Standpipe System: Includes NPS 2-1/2 (DN 65) hose connections. Does not have permanent water supply. Piping is dry. Water must be pumped into standpipes to satisfy demand.

1.6 PERFORMANCE REQUIREMENTS

- A. Minimum Pipe Sizes: Not smaller than sizes indicated for connection to fire department connection and standpipes.
- B. Conduct fire hydrant flow tests as required to obtain hydraulic data needed to prepare design for hydraulically calculated systems.
- C. Components and Installation: Capable of producing piping systems with the following minimum working pressure ratings except where indicated otherwise.
 - 1. Standpipe and Hose Systems: 200 psig

1.7 SUBMITTALS

- A. General: Submit information specified in the submittals Section of "Basic Mechanical Requirements" in accordance with conditions of Contract and Division 01 "Specifications" Section.
- B. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- C. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firms whose equipment, specialties, and accessories are listed by product name and manufacturer in UL Fire Protection Equipment Directory and FM Approval Guide and that conform to other requirements indicated.
- B. Listing/Approval Stamp, Label, or Other Marking: On equipment, specialties, and accessories made to specified standards.
- C. Comply with requirements of authority having jurisdiction for submittals, approvals, materials, hose threads, installation, inspections, and testing.
- D. NFPA Standards: Equipment, specialties, accessories, installation, and testing complying with the following: (See Division 15 for additional testing requirements.)
 - 1. NFPA 14 "Standard for the Installation of Standpipe and Hose Systems".

PART 2 - PRODUCTS

2.1 STANDPIPE SYSTEM

- A. All components are to be UL listed and FM approved.
- B. Pipe: Pipe shall be designed to withstand a system working pressure of not less than 200 psi.
 - 1. Above ground: Schedule 40, Galvanized inside and out with threaded joints:
 - a. ASTM A53, Grade A, "Welded & Seamless Steel Pipe".
 - b. ASTM A795, "Spec. for Black & Hot-Dipped Zinc Coated (Galvanized) Welded & Seamless Steel Pipe for Fire Protection Use".
- C. Fittings: ANSI B16.4, 250 psi hot dipped galvanized malleable or cast-iron screwed.
- D. Hose Valves: 300 psi 2.5 in. (63.5mm) size complete with adapters, cap and chain, and local city Fire Department standard hose threads. Similar to Elkhart U-25-2.5.
- E. Drain Valve: 200 psi, bronzed globe, integral seats, renewable seat with threaded ends.
- F. Provide base threads for fittings complying with standards of local Fire Department.
- G. Standpipe isolation valves shall be indicating type OS & Y gate valves with solid wedge disc and flanged ends.
- H. Provide a 0 to 300 psi 3.5 inch diameter pressure gauge at the top of each standpipe riser.
- I. Double Check Detector Assembly, 8 in. Shall meet AWWA and USC Foundation for Cross Control and Hydraulic Research Requirements.
- J. Water Flow Detector: Grinnell No. VSR-F.
- K. Vertical Indicator Posts: Grinnell No. F750 with tamper switch.
- L. All clamps, rods and other supporting material shall be hot dipped galvanized or stainless steel.

PART 3 - EXECUTION

3.1 PREPARATION

3.2 EXAMINATION

- A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.
- B. Examine walls and partitions for suitable thickness, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PIPING INSTALLATION

- A. Install in accordance with NFPA 14:
 - 1. Provide standpipes and hose valves at locations as shown on Drawings. Hose valves shall have a sign marked, "MANUAL DRY STANDPIPE FOR FIRE DEPARTMENT USE ONLY".
 - 2. On riser at each parking level, provide 2.5 in. (63.5 mm) hose valve with 2.5 in. (63.5 mm) to 1.5 in. (38 mm) adapter, cap and chain.
 - 3. Provide isolation valves at base of each standpipe, with a sign marked, "RISER ISOLATION CONTROL VALVE".
 - 4. Provide other valves as noted on Drawings.
 - 5. At Siamese inlet connection provide permanent, brass base plate marked, "STANDPIPE".
 - 6. Paint above ground portions of standpipe system.
 - 7. All clamps, rods and other supporting material shall be hot dipped galvanized or stainless steel.
 - 8. All piping shall be adequately pitched to drain all sections of pipe.
 - 9. Provide minimum hand clearance between valves and wall and columns to allow operation of valve.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Flush, test, and inspect standpipe systems according to NFPA 14, "System Acceptance" Chapter.
 - 4. Energize circuits to electrical equipment and devices.
 - 5. Start and run air compressors.
 - 6. Coordinate with fire-alarm tests. Operate as required.
 - 7. Coordinate with fire-pump tests. Operate as required.
 - 8. Verify that equipment hose threads are same as local fire-department equipment.

- C. Fire-suppression standpipe system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 COMMISSIONING

- A. Starting Procedures: Follow manufacturer's written procedures. If no procedures are prescribed by manufacturer, proceed as follows:
 - 1. Verify that specialty valves, trim, fittings, controls, and accessories have been installed correctly and operate correctly.
 - 2. Verify that specified tests of piping are complete.
 - 3. Check that hose valves and fire department connections have threads compatible with local fire department equipment and have correct pressure rating.
 - 4. Check for correct type and size hose valves.

3.6 DEMONSTRATION

- A. Demonstrate equipment, specialties, and accessories. Review operating and maintenance information.
- B. Schedule demonstration with at least 7 days' advance notice.

END OF SECTION 21 12 00

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SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this and other Sections of Division 22.
- B. References:
 - 1. American National Standards Institute (ANSI):
 - 2. National Standard Plumbing Code (NAPHCC):
 - 3. American Society for Testing and Materials (ASTM):
 - a. ASTM A74, "Specification for Cast Iron Soil Pipe and Fittings".
 - b. ASTM A120, "Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Ordinary Use".

1.2 SUMMARY

- A. This Section includes general administrative and procedural requirements for mechanical installations. Following administrative and procedural requirements are included in this Section to expand the requirements specified in Division 01:
 - 1. Submittals.
 - 2. Coordination/Scheduling/Quality Assurance.
 - 3. Record documents.
 - 4. Maintenance manuals.
 - 5. Cutting and patching.
 - 6. Testing/Guarantee
 - 7. Piping materials and installation common to most piping systems.
 - 8. Fittings and Joints.
 - 9. Floor Drains
 - 10. Cleanouts.
 - 11. Touch up painting and finishing.
 - 12. Cutting and patching.
- B. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. The remainder of Division 22, plus general related specifications including:
 - a. Access to mechanical installations.
 - b. Excavation for mechanical installations within the building boundaries, and from building to utilities connections.

C. Definitions:

1. Term "Contractor" used throughout Division 22 shall mean Mechanical Subcontractor.
2. Term "provide" shall mean to furnish all necessary labor, materials, equipment, accessories, transportation, services, installation and adjustment under Contract amount, including Contractor's profit, overhead and payment of all taxes and fees.

1.3 SUBMITTALS

A. General: Follow the procedures specified in Division 01 Section "Submittal Procedures" and as specified in this Section.

B. Shop Drawings and Catalog Sheets. Include:

1. Floor drains.
2. Cleanouts.
3. Standpipe fire line layout and components.
4. PIV Valves.
5. Support material and hardware.

C. Substitutions:

1. Products are referenced in Specification and on Drawings to establish standard of quality, style, design, and function of materials, equipment, apparatus, or product.
2. There are often several satisfactory substitutes for standardized utilitarian items which satisfy design objectives.
3. Since it is impractical to name all possible brands that might be furnished, substitutes may be proposed unless specifically stated otherwise.
4. Submit substitutions in accordance with Division 01 and General Conditions of Specification and as follows:
 - a. Submit proposed substitute material or equipment to be considered for approval as equivalent to Engineer/Architect at least 7 days before time set for receiving Bids.
 - b. Contractor assumes all engineering and construction costs necessary for revision in Work due to substitute material or equipment.

D. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.

E. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

1.4 COORDINATION

1. Visit site before Bidding to note apparent features which may affect Work. No subsequent allowance will be made because of failure to make this examination before Bidding.
2. Verify all dimensions in field before ordering any material or doing any Work.
3. Verify ceiling heights or other architectural and structural details before installing any piping.
4. No extra compensation will be allowed because of differences between actual measurements and dimensions and those indicated on Drawings.
5. Notify Engineer/Architect in writing of any difference which may be found before proceeding with Work.

1.5 SEQUENCING AND SCHEDULING

1. Coordinate mechanical equipment installation with other building components.
2. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
3. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
4. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
5. Coordinate connection of electrical services.
6. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
7. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames".
8. Schedule Work so as to coordinate with other Contractors.
9. Before starting Work, prepare and submit to Prime Contractor schedule of operations outlining proposed order of procedure, giving dates of execution and estimated time required for completion of each step.
10. After schedule has been accepted by Prime Contractor and Engineer/Architect, do not deviate from schedule without written consent of Prime Contractor.
11. No subsequent extras will be allowed for materials and labor not included by Bidder for Mechanical Work due to lack of familiarity with Contract Documents as they relate to Work of all other trades required for Project.
12. Before construction starts, cut off and plug any abandoned existing services at property line. Coordinate with local utility company and civil engineer.
13. Coordinate service connection to meter with local water department and civil engineer.

1.6 QUALITY ASSURANCE

- A. Qualify welding processes and operators for structural steel according to AWS D1.1 "Structural Welding Code--Steel".

- B. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".
 - 1. Comply with provisions of ASME B31 Series "Code for Pressure Piping".
 - 2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.
- C. ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.
- D. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. No additional costs will be approved for these increases, if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.7 CODES AND STANDARDS

- 1. Comply with:
 - a. American Welding Society (AWS).
 - b. American Society of Mechanical Engineers (ASME).
 - c. American National Standards Institute (ANSI).
 - d. American Society for Testing and Materials (ASTM).
 - e. American Insurance Association (A.I.A.).
 - f. National Fire Protection Association (NFPA).
 - g. Underwriters' Laboratories, Inc. (UL).
 - h. Manufacturer's Standardization Society of the Valve & Fittings Industry, Inc. (MSS).
 - i. Factory Mutual Research Corp. (FM).
 - j. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)
 - k. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE)
- 2. All local, state, and federal rules and regulations.
 - a. International Building Code (IBC):
 - 1) IBC International Building Code.
 - 2) IBC International Mechanical Code.
 - 3) IBC International Plumbing Code.
 - 4) IBC International Fire Prevention Code.
- 3. Should any change in Drawings and Specifications be required to comply with local regulations, notify Engineer/Architect at least 7 days before time set for receiving Bids. After entering into contract, Contractor will be held to complete all Work necessary to meet local requirements without extra expense to Owner.

4. Maintain a competent superintendent at Project throughout progress of Work and until Work is completed.

1.8 RECORD DOCUMENTS

- A. Prepare record documents in accordance with the requirements in Division 01 Section "Closeout Procedures". In addition to the requirements specified in Division 01, indicate the following installed conditions:
 1. Mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located (i.e., traps, strainers, expansion compensators, tanks, etc.). Valve location diagrams, complete with valve tag chart. Indicate actual inverts and horizontal locations of underground piping.
 2. Equipment locations (exposed and concealed), dimensioned from prominent building lines.
 3. Approved substitutions, contract modifications, and actual equipment and materials installed.
 4. Contract modifications, actual equipment and materials installed.
- B. Engage the services of a Land Surveyor or Professional Engineer registered in the state in which the project is located as specified in Division 01 Section "Execution Requirements" to record the locations and invert elevations of underground installations.

1.9 MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with Division 01 Section "Closeout Procedures" In addition to the requirements specified in Division 01, include the following information for equipment items:
 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 4. Servicing instructions and lubrication charts and schedules.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

- B. Deliver materials to Project in good condition. Store materials off ground and protected from elements.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 ROUGH-IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.
- B. Refer to equipment specifications in Divisions 02 through 33 for rough-in requirements.
- C. Drawings are generally diagrammatic and indicative of Work to be installed.
- D. Do not scale Drawings for rough-in Work.

3.2 MECHANICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of mechanical systems, materials, and equipment. Comply with the following requirements:
 - 1. Coordinate mechanical systems, equipment, and materials installation with other building components so as not to delay Contractors.
 - 2. Verify all dimensions by field measurements.
 - 3. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for mechanical installations.
 - 4. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.
 - 5. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.
 - 6. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
 - 7. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.
 - 8. Install systems, materials, and equipment to conform with approved submittal data to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Engineer/Architect.

9. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
10. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
11. Install access panel or doors where units are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames" and this section.
12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
13. Install piping to occupy minimum of space. Install parallel and close to walls, ceiling, columns or other members providing proper space for covering or removal of pipes.
14. Coordinate Work to avoid interferences with other trades.
15. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings or valves which may be required. Investigate structural and finish conditions affecting this Work. Plan accordingly, furnishing such offsets, fittings and valves as may be required.
16. Where possible, locate all plumbing lines in areas which are out of public view.
17. Review plumbing layout with Engineer/Architect before construction.
18. In case of conflict between riser diagram and floor plan, greater quantity or better quality prevails, subject to approval of Engineer/Architect.
19. Coordinate all Work specified in this Division with Work of all other trades required for Project.
20. Check Structural Drawings for location of drains, vents and other Mechanical Work. In case of conflict between Structural Drawings and Mechanical Drawings, Structural Drawings take precedence.
21. Notify Engineer/Architect immediately and confirm in writing of any conflict between Mechanical and Structural Drawings.
22. Finish painting will be done by others.
23. Any galvanized equipment, material, or hardware that is cut, scratched, field threaded or grooved shall be coated with a Zinc Rich Coating (ZRC or approved equivalent).
24. Trench and backfill in accordance with Division 31 Section "Earth Moving."
25. In case interferences between Work develop, Engineer/Architect will decide which Work is to be relocated regardless of which was first installed.
26. Cleanup:
 - a. At completion of Work under this contract, remove from site and dispose of all rubbish and discarded materials and restore disturbed facilities and surfaces.
 - b. Provide entire installation thoroughly free from all oil and grease after successfully completing all tests and before Work is turned over to Owner.

3.3 PIPING SYSTEMS-COMMON REQUIREMENTS

- A. General: Install piping as described below, except where system Sections specify otherwise.

- B. General Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated.
- C. Install all piping parallel to building walls and column lines at such height for proper drainage and so not to interfere with doorways, stairway or traffic.
- D. Install suspended pipes as close to ceiling as possible and at uniform grade.
- E. Where interferences develop in field, offset or reroute piping as required to clear such interferences. Use proper fittings, no bent pipe is permitted.
- F. Install full-time water lines in areas not subject to freezing within building and below frost line and minimum of 36 in. below grade outside building.
- G. Install water meter and backflow preventor in protected area not subject to freezing.
- H. Use small amount of prepared, pipe thread lubricant on outside threads.
- I. Work pipe into place without springing
- J. Install all piping such that it will drain and vent as shown or required.
- K. Provide uniform grade to all horizontal pipes and provide drains at all low points in water piping system.
- L. Cast-in-Place Insert Installation: Before placement of concrete, furnish, locate and set on forms, cast-in-place inserts which support Mechanical Work.
- M. Furnish hot dipped galvanized steel pipe sleeves extended one inch above finished floor line for all pipe running through floors.
- N. Install piping at indicated slope.
- O. Install components having pressure rating equal to or greater than system operating pressure.
- P. Install piping free of sags and bends and neat in appearance.
- Q. Install couplings according to manufacturer's printed instructions.
- R. Below Grade, Exterior Wall, Pipe Penetrations: Install cast-iron wall pipes for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-in. (25mm) annular clear space between pipe and sleeve for installation of mechanical seals.
- S. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping sealant material. Firestopping materials are specified in Division 07 Section "Penetration Firestopping".
- T. Verify final equipment locations for roughing in.

- U. Refer to equipment specifications in other Sections for roughing-in requirements.
- V. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping system Sections.
 - 1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
 - 2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- W. All piping routed over finished areas must be insulated.

3.4 EQUIPMENT INSTALLATION--COMMON REQUIREMENTS

- A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.
- B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Engineer/Architect.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.
- D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location. Provide unions to facilitate equipment replacement.
- E. Install equipment giving right-of-way to piping systems installed at a required slope.
- F. Provide 4 inch high concrete housekeeping pad with rounded edges under all floor mounted equipment where clearance allows.
- G. Fasteners and Anchors: Hot dipped galvanized or stainless steel, type, grade, and class as required. Mounting holes for all fasteners must be drilled. The use of powder, gas, or other types of power propelled fasteners is prohibited.

3.5 HANGER AND SUPPORT INSTALLATION:

- A. Support piping in building on standard clevis type (MSS SP-69, No. 1) hangers, with adjustable rods.
- B. Properly support all piping installed on suitable pipe hangers and supports. Permanent hangers, supports, and anchors shall be fabricated from durable materials, hot dipped galvanized or stainless steel, suitable for service conditions in accordance with details on Drawings.
- C. Base required strength of all supporting equipment on combined weight of piping filled with water, plus any insulating covering.

- D. Install hangers for horizontal piping with following minimum rod sizes:

<u>Nominal Pipe Size</u>	<u>Minimum Rod Size</u>
0.75 in. to 2 in. pipe	0.375 in.
2.5 in. to 3.5 in. pipe	0.5 in.
4 in. to 5 in. pipe	0.625 in.
6 in. pipe	0.75 in.
8 in. to 12 in. pipe	0.875 in.

- E. Provide and install anchors in piping system to fix direction of expansion and contraction. Fabricate and assemble anchors to secure desired points of piping in relatively fixed positions. Hangers shall permit line to take up expansion and contraction freely in opposite directions away from anchored point and shall be so arranged as to be structurally suitable for particular location, line, and loading conditions in question.
- F. Use expansion anchors to anchor pipe hanger and supports where inserts have been improperly located, or where necessary to support piping from existing concrete construction. Provide expansion anchors equal to Ackerman-Johnson, Paine, Phillips, Hilti, ITW Ramset/Red Head, or Rawl. Expansion anchor locations must have approval of Engineer/Architect before installation. Coordinate location with structural.
- G. Support parallel pipe lines at same level on approved trapeze or saddle type hangers.
- H. Use steel rods to attach ring or trapeze hangers to building structure. Space hangers at sufficiently close intervals to support piping and its contents, 12 ft on center maximum for threaded pipes.
- I. Support copper piping with copper clevis hangers, or clevis hanger with copper supporting loop.
- J. Provide sheet metal collar at each pipe hanger for insulated pipe with vapor barrier.
- K. Any support hardware or material that is cut, scratched or threaded shall be coated with a zinc rich coating (ZRC or equivalent) at these locations.

3.6 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Division 01 Section "Execution". In addition to the requirements specified in Division 01, the following requirements apply:
1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
 2. Perform cutting, fitting, and patching of mechanical equipment and materials required to:
 - a. Uncover Work to provide for installation of improperly scheduled Work.
 - b. Remove and replace defective Work.

- c. Remove and replace Work not conforming to requirements of the Contract Documents.
 - d. Remove samples of installed Work as specified for testing.
 - e. Install equipment and materials in structures.
 - f. Upon written instructions from the Engineer/Architect, uncover and restore Work to provide for Architect/Engineer observation of concealed Work.
- B. Cut, remove and legally dispose of selected mechanical equipment, components, and materials as indicated, including but not limited to removal of mechanical piping, heating units, and trim, and other mechanical items made obsolete by the new Work.
 - 1. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.
 - 2. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
 - 3. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
 - a. Refer to Division 01 Section "Reference Standards and Definitions" for definition of "experienced Installer".
 - 4. Respective trades will provide openings in floors, walls, and other members as required for installation of piping and equipment, provided that necessary information regarding such openings is furnished by contractor in timely manner.
 - 5. If contractor fails to provide information regarding required openings, cutting and repairing of completed Work will be performed by respective trades at expense of contractor.
 - 6. Seal all such openings in accordance with Division 07 Section "Concrete Joint Sealants."
 - 7. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations only with written approval of Engineer/Architect. Perform cutting by skilled mechanics of the trades involved.
 - 8. Repair cut surfaces to match adjacent surfaces.

3.7 LABELING AND IDENTIFYING

- A. Piping Systems: Install pipe markers on each system. Include arrows showing normal direction of flow.
 - 1. Stenciled Markers: Complying with ASME A13.1.
 - 2. Locate pipe markers wherever piping is exposed in finished spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), and exposed exterior locations as follows:
 - a. Near each branch, excluding short take-offs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.
 - b. Spaced at a maximum of 50 ft (15m) intervals along each run. Reduce intervals to 25 ft (7.6 m) in congested areas of piping and equipment.

- B. Adjusting: Relocate identifying devices which become visually blocked by work of this Division or other Divisions.

3.8 PAINTING AND FINISHING

- A. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.9 TESTING AND GUARANTEE

- A. Testing:
 - 1. Take out all necessary permits, arrange for all required inspections, and pay all fees and expenses associated with performing Mechanical Work.
 - 2. Test all piping systems at full operating pressure under normal conditions of use in accordance with requirements of Water Department, Board of Health, Fire Department, and all other authorities having jurisdiction. As a minimum, the water supply system shall be tested at 125 psi for 4 hrs, the sewer system at 5 psi for 15 minutes, natural gas at 100 psi for 2 hours, and the standpipe system at 225 psi for 2 hrs.
 - 3. Provide all instruments for making tests.
 - 4. Perform tests on following systems:
 - a. Sewer System.
 - b. Standpipe System.
 - 5. Test all parts of system in presence of Contractor, Engineer/Architect, Owner and Authority having jurisdiction for sufficient period of time to permit complete examination and inspection.
 - 6. Successfully test all concealed piping before its being permanently covered up.
 - 7. Remedy all defects in materials or workmanship which appear during test or retest of system.
- B. Guarantee:
 - 1. In addition to any specific guarantee called for by Specifications, furnish to Owner written guarantee against defects in materials, workmanship for all apparatus and materials furnished, and for entire workmanship of installation for period of 1 yr from date of acceptance of Work.
 - 2. During guarantee period and without expense to Owner, repair all defects in workmanship or material provided under this Section.

END OF SECTION 22 05 00

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SECTION 22 14 13 - FACILITY STORM DRAINAGE PIPING

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. In accordance with Contract Documents, furnish all labor equipment, and materials to install domestic water, and storm sewer plumbing facility.
- B. This Section includes plumbing piping systems as indicated on the Drawings. Systems include the following:
 - 1. Drainage and vent systems.
- C. Related Sections: Following Sections contain requirements that relate to this Section:
 - 1. Division 22 Section "Common Work Results for Plumbing".

1.3 PERFORMANCE REQUIREMENTS

- A. Provide components and installation capable of producing piping systems with the following minimum working pressure ratings, except where indicated otherwise:
 - 1. Storm Drainage Systems: 10-ft head of water.

1.4 SUBMITTALS

- A. General: Submit the information specified in the submittals Section of "Basic Mechanical Requirements" in accordance with Conditions of Contract and Division 01 Specifications Section.
- B. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- C. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.

PART 2 - PRODUCTS

2.1 GENERAL

- A. See Division 22 Section "Common Work Results for Plumbing" for acceptable products and manufacturers.

2.2 MATERIALS

- A. General:

- 1. Provide new materials of the best grade and quality.

- B. Pipe:

- 1. Drainage:

- a. Cast iron: (Storm drainage 15" and smaller)
 - 1) Above ground: Cast iron "No Hub", ASTM A888.

- C. Fittings and Joints:

- 1. Fittings for cast-iron soil pipe: Correspond to pipe in material, ASTM A74.
 - 2. Joints in buried cast-iron pipe: Approved rubber gaskets.

- D. Floor and Trench Drains: Heavy duty cast-iron with coated, heavy duty, vandal-proof grate and sediment buckets. Size, connection type and additional options are as specified on Drawings.

- 1. Acceptable Manufacturers:

- a. Josam
 - b. Smith.
 - c. Wade.
 - d. Zurn.
 - e. Ancon.

- E. Backwater Valves: Coated cast iron backwater valve, plastic ball float, elastomer seat, bronze cage and threaded or spigot outlet connection:

- 1. Acceptable Manufacturers:

- a. Josam 1000 Series.
 - b. Smith 7000 Series.
 - c. Zurn Z-1099 Series.
 - d. Ancon BV 230-R.

- F. Cleanouts:

- 1. In conductor risers: Coated cast iron cleanout tee with hub and spigot connections and coated cast iron plug with internal gasket seal for installation in unfinished areas. Where finished appearance in wall installation is required, use in conjunction with access cover or box:

- a. Acceptable manufacturers:
 - 1) Josam 58510 Series.
 - 2) Smith 4510 Series.
 - 3) Wade W-8560 Series.
 - 4) Zurn Z-1400 Series.
 - 5) Ancon CO-460.

- G. Clamps, rods and all support material and hardware shall be hot dipped galvanized or stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Sewer Systems:

1. Provide piping, floor drains and accessories, backwater valve, catch basins, manholes, covers, pumps, or any other required components complete to existing storm, sanitary or combined sewer on site.
2. Pitch all horizontal lines 0.125 in. per ft minimum.
3. All cast-iron pipe buried in ground shall have firm bearing along entire length of undisturbed earth, or on compacted sand. Pipe on fill or loose soil shall be supported on brick or concrete piers, and then firmly embedded in earth. At foot of each stack, block concrete foundation shall be provided for stack, block concrete foundation shall be provided for stack to rest on.
4. Provide and set cleanouts for all drains inside building at ends of all horizontal branches, at base of all stacks, and all points where so indicated, called for, or necessary to clear line of obstructions.
5. Provide cast-iron Y-branch with cleanout at side in locations where cleanout will not be readily accessible due to interference of wall or other member.
6. Provide plugs for cleanouts.
7. Provide Owner with wrench to use for countersunk nuts on cleanout plugs.

3.2 COMMISSIONING

A. Preparation: Perform following checks before start-up:

1. Systems tests are complete.
2. Damaged and defective specialties and accessories have been replaced or repaired.
3. There is clear space for servicing of specialties.
4. Remove and clean strainers.
5. Verify drainage and vent piping are clear of obstructions. Flush with water until clear.

B. Test and certify systems in accordance with Division 22 Section "Common Work Results for Plumbing".

3.3 ADJUSTING

- A. Adjust operation and correct deficiencies discovered during commissioning.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel on procedures related to startup and servicing of interceptors.

3.5 PROTECTION

- A. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- B. Place plugs in ends of uncompleted piping at end of day or when work stops.

END OF SECTION 22 14 13

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SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections apply to this and the other Sections of Division 26.
- B. References.
 - 1. American Society for Testing and Materials (ASTM):
 - a. ASTM A123, "Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products".
 - 2. ANSI/NFPA 70:
 - a. "National Electrical Code (NEC)", latest edition.
 - 3. National Fire Protection Association (NFPA).
 - 4. Federal Specification (FS).
 - 5. ANSI/IEEE C.2:
 - a. "National Electrical Safety Code (NESC)", latest edition.
 - 6. Underwriters' Laboratories, Inc. (UL).
 - 7. Insulated Cable Engineers Association, Inc. (ICEA).
 - 8. National Electrical Manufacturers Association (NEMA).

1.2 SUMMARY

- A. This Section includes limited scope general construction materials and methods for application with electrical installations as follows:
 - 1. Submittals.
 - 2. Coordination/Scheduling/Temporary Power/Quality Assurance
 - 3. Record documents.
 - 4. Maintenance manuals.
 - 5. Rough-ins.
 - 6. Electrical installations.
 - 7. Cutting and patching.
 - 8. Testing/Demonstration/Guarantee
 - 9. Conduit.
 - 10. Encasement for Underground Conduit.
 - 11. Conductors (under 600V).

12. Wiring Devices.
13. Electrical Boxes & Fittings.
14. Equipment Supports Sleeves and Guards.
15. Miscellaneous Metals.
16. Joint Sealers.

B. Related Sections: Following Sections contain requirements that relate to this Section:

1. The remainder of Division 26, plus general related specifications including:
 - a. Access to electrical installations.
 - b. Excavation for electrical installations within the building boundaries and from building to utility connections.

1.3 DEFINITIONS

A. Hazardous Areas:

1. Open parking structures used for parking and storage are not classified as hazardous by National Electrical Code, ANSI/NFPA 70, Article 511.
2. Term "Contractor" used throughout Division 26 shall mean Electrical Subcontractor.
3. Term "provide" shall mean to furnish all necessary labor, materials, equipment, accessories, transportation, services, installation and adjustment under Contract amount, including Contractor's profit, overhead and payment of all taxes and fees.

1.4 SUBMITTALS

- A. General: Submit the information specified in accordance with Conditions of Contract and Division 01 Specification Sections.
- B. See requirements of Division 01 Section, "Submittal Procedures," Part 1 heading, "Submittal Procedures," for limits to resubmittals.
- C. See requirements of Division 01 Section, "Submittal Procedures," Part 2 heading, "Requests for Information," for RFI constraints.
- D. General: Follow procedures specified in Division 01 Section "Submittal Procedures" and as specified in this Section.
- E. Shop Drawings. Include:
 1. Power and distribution panels.
 2. Lighting panels.
 3. Disconnect switches.
 4. Motor starters.
 5. Lighting control panel.
 6. Light standards (poles) with material certifications.
 7. Transformers.

- F. Catalog sheets with notation of proposed materials. Include:
 - 1. Wire and cable.
 - 2. Conduit, fittings and supports.
 - 3. Boxes.
- G. Substitutions
 - 1. Products are referenced in Specification and Drawings to establish standard of quality, style, design, and function of materials, equipment, apparatus, or product.
 - 2. There are often several satisfactory substitutes for standardized utilitarian items which satisfy design objectives.
 - 3. Since it is impractical to name all possible brands that might be furnished, substitutes may be proposed unless specifically stated otherwise.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer for the installation and application joint sealers, access panels, and doors.
- B. Qualify welding processes and welding operators in accordance with AWS D1.1 "Structural Welding Code - Steel".
 - 1. Certify that each welder has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone recertification.

1.6 PROJECT CONDITIONS

- A. Conditions Affecting Selective Demolition: Following project conditions apply:
 - 1. Locate, identify, and protect electrical services passing through demolition area and serving other areas outside the demolition limits. Maintain services to areas outside demolition limits. When services must be interrupted, install temporary services for affected areas.

1.7 COORDINATION/SCHEDULING/TEMPORARY POWER/CODES AND STANDARDS

- A. Coordination
 - 1. Visit site before Bidding to note apparent features which may affect Work. No subsequent allowance will be made because of failure to make examination before Bidding.
 - 2. Check conditions in actual Project against Drawings for all dimensions door swings, ceiling heights or other features affecting electrical Work.
 - 3. Verify all dimensions in field before ordering any material or doing any Work.
 - 4. No extra compensation will be allowed because of differences between actual measurements and dimensions and those indicated on Drawings.
 - 5. Notify Engineer/Architect in writing of any differences which may be found before proceeding with Work.

B. Scheduling

1. Schedule Work so as not to delay other Contractors.
2. Before starting Work, prepare and submit to Prime Contractor schedule of operations outlining proposed order of procedure, giving dates of execution and estimated time required for completion of each step.
3. Coordinate shut-off and disconnection of electrical service with the Owner and the utility company.
4. After schedule has been accepted by Prime Contractor and Engineer/Architect, do not deviate from schedule without written consent of Prime Contractor.
5. No subsequent extras will be allowed for materials and labor not included by Bidder for electrical Work due to lack of familiarity with Contract Documents as they relate to Work of all other trades required for Project.

C. Codes and Standards:

1. Comply with:
 - a. State electrical administration and local inspection department recognized by state as having jurisdiction.
 - b. Requirements of state and federal Occupational Safety and Health Acts.
 - c. Latest edition of "National Electrical Code", ANSI/NFPA 70.
 - d. Latest edition of "National Electrical Safety Code", ANSI C2.
 - e. Underwriters Laboratories (UL).
 - f. National Electrical Manufacturers' Association (NEMA).
 - g. Institute of Electrical and Electronics Engineers (IEEE).
 - h. Illumination Engineering Society (IES).
 - i. National Fire Protection Association (NFPA).
 - j. International Building Code (IBC):
 - 1) IBC International Building Code.
 - 2) IBC International Mechanical Code.
 - 3) IBC International Plumbing Code.
 - 4) IBC International Fire Prevention Code.

1.8 MAINTENANCE MANUALS

- A. Prepare maintenance manuals in accordance with Division 01 Section "Closeout Procedures". In addition to requirements specified in Division 01, include the following information for equipment items:
1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.

4. Servicing instructions and lubrication charts and schedules.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- B. Deliver materials to project in good condition. Store materials off ground and protected from elements.
- C. Identify distribution equipment, contactors, control stations, and other devices with permanent, engraved nameplates attached with screws proportional to size of equipment stating name of item and system of which it is part.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide:
 1. Materials that are new and listed by Underwriters' Laboratories, Inc., bearing their label.
 2. Materials suitable for environment and exposure
 3. Weatherproof or raintight outdoor equipment.
- B. Conform with:
 1. National Electrical Code (ANSI/NFPA 70).
 2. All state and local codes.
 3. National Electrical Manufacturers Association (NEMA).
 4. American National Standards Institute (ANSI).
 5. National Fire Protection Association, Inc. (NFPA).
 6. Insulated Cable Engineers Association, Inc. (ICEA).
 7. Underwriters' Laboratories, Inc. (UL).
 8. Institute of Electrical and Electronic Engineers (IEEE).

2.2 CONDUIT

- A. Exposed: Rigid hot-dipped galvanized steel with threaded fittings. (EMT conduit shall not be used in any location.)
 1. Acceptable Manufacturers:
 - a. Allied Tube & Conduit Corp.
 - b. Western Tube & Conduit Corp.
 - c. Wheatland Tube Co.

- B. Embedded and Underground: rigid, Schedule 40 with cemented couplings in accordance with NEMA TC-6:
 - 1. Acceptable Manufacturers:
 - a. Carlon.
 - b. Condux International, Inc.
 - c. Certaineed Products Corp.
 - d. Thomas & Betts.
- C. At building expansion joints provide at exposed conduit runs only:
 - 1. O.Z. Gedney Type AX Expansion Fittings.

2.3 CONDUCTORS (UNDER 600 V)

- A. Use copper wire, sized as indicated on the drawings or per NEC when not indicated with No. 10 AWG being minimum allowable power conductor size. Control wiring shall not be less than No. 12 AWG unless otherwise indicated on Drawings.
- B. No. 10 AWG and No. 12 AWG; provide solid wire, No. 8 AWG and larger; provide stranded wire.
- C. Conductor Insulation: THWN
- D. Conductors in fluorescent fixture channels: "THHN"
- E. Insulation types of better quality or ratings may be used with Engineer/Architect's approval.
- F. Include green colored grounding conductors, sized as indicated on Drawings or per NEC 250 when not indicated, but no smaller than #10, in conduits to provide electrical grounding continuity to all boxes, devices, and outlets.
- G. Color code secondary service, feeder, and branch circuit conductors with factory applied color as follows:

<u>208Y/120 Volts</u>	<u>Phase</u>	<u>480Y/277Volts</u>
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Natural Gray
Green	Ground	Green

Phasing at terminals shall be A-B-C, from front to back, top to bottom, or left to right as viewed from the front.

- H. The phase rotation of all normal power, generator power, and UPS systems must be aligned. Reduced size neutral conductors are not permitted.

2.4 ELECTRICAL BOXES AND FITTINGS:

- A. Outlet, device, pull and junction boxes, conduit bodies and fittings shall be sized per NEC Article 370. All conduit connections shall be threaded.
- B. Surface boxes and covers: (Aluminum boxes are not acceptable)
 - 1. Weatherproof hot-dip galvanized cast metal or malleable iron with threaded fittings.
 - 2. Weatherproof zinc electroplated cast metal or malleable iron with threaded fittings.
- C. Boxes for other areas and uses: Gasketed screw cover boxes, 14 or 12 gage, G-90 grade galvanized bodies, 12 or 10 gage G-90 grade galvanized steel covers, NEMA 3R GSC with threaded hubs.
- D. Boxes embedded in walls: Concrete type.

2.5 MATERIAL AND EQUIPMENT SUPPORTS, SLEEVES, AND GUARDS:

- A. Provide supports, foundations, stands, platforms, anchor bolts, and other necessary material required to install electrical equipment and systems. When anchor bolts for lighting poles, or other fasteners, are embedded in structure as it is being erected, provide templates and coordinate installation. Anchor bolts and baseplates shall be hot-dip galvanized in accordance with ASTM A153. Bond 1 anchor bolt to structural rebar.
- B. Provide hot-dipped galvanized steel sleeves in walls and floors for passage of exposed conduit. Make sleeves watertight and extend sleeves through floors 6 in. above finished floor. Caulk space between conduit and sleeve.
- C. Provide approved, hot-dipped galvanized steel guards around junction boxes, conduits, and equipment which may be exposed to vehicle damage.

2.6 MISCELLANEOUS METALS

- A. Steel plates, shapes, bars, and bar grating: ASTM A 36.
- B. Cold-Formed Steel Tubing: ASTM A 500.
- C. Hot-Rolled Steel Tubing: ASTM A 501.
- D. Steel Pipe: ASTM A 53, Schedule 40, welded.
- E. Nonshrink, Nonmetallic Grout: Premixed, factory-packages, nonstaining, noncorrosive, nongaseous grout, recommended for interior and exterior applications.
- F. Fasteners and Anchors: Hot dipped galvanized or stainless steel, type, grade, and class as required. Mounting holes for all fasteners must be drilled. The use of powder, gas, or other types of power propelled fasteners is prohibited.

2.7 JOINT SEALERS

- A. General: Joint sealers, joint fillers, and other related materials compatible with each other and with joint substrates under conditions of service and application as specified in Division 07 "Joint Sealants".
- B. Colors: As selected by Engineer/Architect from manufacturer's standard colors.
- C. Fire-Resistant Joint Sealers: Two-part, foamed-in-place, silicone sealant formulated for use in through-penetration fire-stopping around cables, conduit, pipes, and duct penetrations through fire-rated walls and floors. Sealants and accessories shall have fire-resistance ratings indicated, as established by testing identical assemblies in accordance with ASTM E 814, by Underwriters' Laboratories, Inc., or other testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Products: Subject to compliance with requirements, provide 1 of the following:
 - a. "Dow Corning Fire Stop Foam", Dow Corning Corp.
 - b. "Pensil 851", General Electric Co.

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 installation and application of joint sealers and access panels. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 ELECTRICAL INSTALLATIONS

- A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:
 - 1. Maintain competent superintendent at site throughout progress of Work until work completed.
 - 2. Use only skilled workers experienced in electrical construction.
 - 3. Coordinate electrical systems, equipment, and materials installation with other building components so as not to delay contractors.
 - 4. Verify all dimensions by field measurements.
 - 5. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.
 - 6. Coordinate installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components as they are constructed.
 - 7. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.

8. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.
9. Install systems, materials, and equipment to conform with approved submittal data to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to Engineer/Architect.
10. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.
11. I
12. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.
13. Provide and install or arrange for installation of anchors supports, support frames, light pole anchor bolts, and other items required for installation of materials or equipment specified under this Division.
14. Conduit runs between outlets and home-run conduits may be arranged or grouped to suit job conditions, but follow circuit patterns as designated on Drawings.
15. Review location of all electrical conduit with Engineer/Architect before construction.
16. Cooperate with others to locate electrical conduit out of public view.
17. In case of conflict between riser diagram and floor plan, greater quantity or better quality prevails, subject to approval of Engineer/Architect.
18. In case interferences between Work develop, Engineer/Architect will decide which Work is to be relocated regardless of which was first installed.
19. Any galvanized equipment, materials or hardware that is cut, scratched or field threaded, shall be coated with a zinc rich coating (ZRC or approved equivalent) at these locations.
20. Cleanup: At completion of Work under this contract, remove from building site and dispose of all rubbish and discarded materials and restore disturbed facilities and surfaces.

3.3 CONDUIT INSTALLATION

- A. Conduit shall be sized to provide maximum 40% fill per NEC with 3/4 in. being minimum allowable size. Use large radius sweeps in all bends.
- B. In parking areas and unfinished equipment storage/utility rooms, run conduit under slab on grade or exposed unless otherwise indicated. Coordinate location with Engineer/Architect.
- C. In elevator lobbies, office areas and other finished areas, conceal conduit runs unless otherwise noted on Drawings.
- D. Terminate conduits at all outlets and switches in suitable outlet boxes. Where 2 or more compatible devices are set side by side, set in gang boxes, unless otherwise noted on Drawings.
- E. Coordinate with Engineer/Architect to locate exposed conduit runs. All exposed conduit shall be run square with building except where specifically noted otherwise on Drawings.

- F. Securely fasten exposed conduits to ceiling or walls with 1 hole malleable iron hot-dip galvanized pipe straps and clamp backs at 8 ft on center maximum. Provide nest backs or other spacers or extensions as required to achieve proper mounting heights. Using blockouts or other structural members as a source of support is prohibited.
- G. Close all unused open knockouts.
- H. Provide nylon pull cords in all empty conduits.
- I. Take precautions to prevent water, dirt, concrete, or other material from entering conduit and junction boxes.
- J. Coring and drilling of walls and beams to conceal conduit and risers are responsibility of this Contractor. Slots in double tees are by precaster. Verify exact locations of penetrations with Engineer/Architect before coring and drilling. Seal all such openings in accordance with Division 07 "Joint Sealants".
- K. Conduits penetrating through fire rated walls and floor slabs shall be sealed against spread of fire and products of combustion with intumescent fire barrier penetration sealing system with fire/smoke rating of floor or wall through which conduits pass. Firestopping materials.
- L. Conduit containing emergency circuits shall not contain any other type of circuit.
- M. Box covers located less than 8 ft above the floor shall be equipped with tamperproof screws.
- N. Any conduit that is cut, scratched or threaded shall be coated with a zinc rich coating (ZRC or approved equivalent) at these locations.
- O. All conduit connections must be threaded. All conduit connections to panels, boxes, fixtures and other equipment must be made with gasketed threaded hubs.
- P. Do not route vertical conduit risers through expansion joints.

3.4 CONDUCTOR INSTALLATION:

- A. All conductors shall be run in conduit.
- B. All wire to wire connections shall be made with properly sized wire nuts.
- C. Increase wire sizes on long runs to minimize voltage drop to 3% maximum from panel to most distant outlet.
- D. Do not begin wiring until work which might cause damage to wires or conduit has been completed.
- E. When there are more than 3 current carrying conductors in conduit, apply NEC Ampacity Adjustment Factor, assuming no diversity, and increase conductor sizes as required. (Also comply with any additional local requirements.)

- F. Wiring from emergency source or emergency source distribution over current protection to emergency loads shall be kept entirely independent of all other wiring and equipment and shall not enter same raceway, cable, box, or cabinet with other wiring.
- G. Use Burndy reducer adaptors as required to connect oversized conductors to breakers or other pieces of equipment.

3.5 ELECTRICAL BOXES AND FITTINGS INSTALLATION:

- A. Provide box for each device and junction box shown on Drawings.
- B. Close unused openings in all boxes in accordance with NEC.
- C. All boxes and enclosures for emergency circuits shall be marked so they will be readily identified as component of emergency circuit.

3.6 CUTTING AND PATCHING

- A. General: Perform cutting and patching in accordance with Division 01 Section "Execution". In addition to the requirements specified in Division 01, the following requirements apply:
 - 1. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.
 - 2. Perform cutting, fitting, and patching of electrical equipment and materials required to:
 - a. Uncover Work to provide for installation of improperly scheduled Work.
 - b. Remove and replace defective Work.
 - c. Remove and replace Work not conforming to requirements of the Contract Documents.
 - d. Remove samples of installed Work as specified for testing.
 - e. Install equipment and materials in structures.
 - 3. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.
 - 4. Patch existing finished surfaces and building components using new materials matching existing materials and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.
 - a. Refer to Division 01 Section "Reference Standards and Definitions" for definition of experienced "Installer".
 - 5. Patch finished surfaces and building components using new materials specified for the original installation and experienced Installers. Installers' qualifications refer to the materials and methods required for the surface and building components being patched.

- a. Refer to Division 01 Section "Reference Standards and Definitions" for definition of experienced "Installer".
- B. Seal all openings in accordance with Division 07 Section "Concrete Joint Sealants".

3.7 TESTING/ DEMONSTRATION/GUARANTEE

- A. Testing:
 - 1. Provide installation free from any faults or grounds and in operating condition.
 - 2. Provide all equipment necessary to make tests.
 - 3. Test all completed electrical systems and components for proper operation.
 - 4. Test motors for proper rotation.
 - 5. If faults or grounds are present, correct problem and retest system.
- B. Guarantee:
 - 1. Leave entire electrical system in proper working order.
 - 2. Provide Owner guarantee that all material, equipment and wiring furnished and installed are free from all electrical and mechanical defects for 1-yr period from date of acceptance of work.
 - 3. Make good any defects which become apparent within that 1-yr guarantee period without expense to Owner.
 - 4. Provide Owner with any other guarantees extended by manufacturers of equipment furnished and installed in Project.

3.8 PARKING AND REVENUE CONTROL SYSTEM (PARCS) WIRING AND CONNECTIONS

- A. Work included:
 - 1. PARCS supplier shall provide this contractor with electrical control components for mounting. Components may include rate-computing clocks, magnetic detectors, space counters, memory units, entrance monitors, relays to shut off ticket dispensers, cash registers, voltage stabilization devices, transient surge suppressors, lightning arrestors, or other equipment.
 - 2. Install all electrical power circuits, loops, interconnections, and final connections to free-standing equipment installed by others. Run power wiring for parking and revenue control system equipment in rigid steel conduit separately from other power circuits. Run control circuits in rigid steel conduit separately from power and communication circuits. Ground all parking and revenue control system equipment in accordance with NEC. Coordinate any additional grounding requirements with PARCS supplier/installer.
 - 3. All parking equipment that does not contain micro-processor electronics shall be supplied by power circuits with wire sized to supply rated voltage to equipment while supplying maximum power specified for equipment. If more than 1 such device is on single power circuit, circuit shall maintain rated voltage of all pieces of equipment while all pieces of equipment are simultaneously being supplied their

- maximum rated power. Power circuits shall meet NEC and provide safety ground circuits.
4. All rigid steel conduit runs shall be continuous and bonded/grounded at terminations in accordance with NEC.
 5. Revisions in conduits and wiring for this system which do not make significant increase in actual installed cost shall not constitute an extra to Project; however, significant decrease (or deletion) in installation shall be basis for credit.
- B. Work Excluded: Parking and Revenue Control System equipment components and protective equipment shall be purchased and paid for by others. Free-standing gates, ticket dispensers, card readers, and other equipment are set in place and anchored by PARCS installer.
- C. Coordination:
1. All PARCS components and devices are internally pre-wired to terminal strips in conveniently accessible terminal compartments. Actual wiring configurations vary between manufacturers. Manufacturer of PARCS will be established after Contract is awarded.
 2. Drawings represent general scope of PARCS installation that is basis of Bid for Project.
 3. Verify exact wiring configuration and equipment locations with PARCS supplier/installer, before installing conduit, boxes, and fixtures. Additional costs for extra items required by PARCS supplier shall be borne by PARCS supplier.
 4. See Division 11 Section "Parking and Revenue Control System."

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SECTION 32 12 16 - ASPHALT PAVING

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. Hot-mix asphalt paving.
 - 2. Hot-mix asphalt patching.

1.3 ACTION SUBMITTALS

- A. Hot-Mix Asphalt Design:
 - 1. Certification, of each hot-mix asphalt design proposed for the Work as provided on DOT projects in the State of New Hampshire.
 - 2. For hot-mix asphalt design proposed for the Work.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For paving-mix manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by authorities having jurisdiction or the DOT of state of New Hampshire.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
 - 2. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

PART 2 - PRODUCTS

2.1 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
- B. Coarse Aggregate: ASTM D692/D692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.
- C. Fine Aggregate: ASTM D1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
 - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- D. Mineral Filler: ASTM D242/D242M or AASHTO M 17, rock or slag dust, hydraulic cement, or other inert material.

2.2 ASPHALT MATERIALS

- A. Asphalt Binder: ASTM D6373 or AASHTO M 320 binder designation.
- B. Asphalt Cement: ASTM D3381/D3381M for viscosity-graded material or ASTM D946/D946M for penetration-graded material.
- C. Water: Potable.

2.3 MIXES

- A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction, "Asphalt Mix Design Methods";] and complying with the following requirements:
 - 1. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
 - 2. Base Course:
 - 3. Surface Course:

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.
 - 1. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

3.3 PATCHING

- A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
- B. Placing Two-Course Patch Material: Partially fill excavated pavements with hot-mix asphalt base course mix and, while still hot, compact. Cover asphalt base course with compacted layer of hot-mix asphalt surface course, finished flush with adjacent surfaces.

3.4 SURFACE PREPARATION

- A. Ensure that prepared subgrade has been compacted and is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

3.5 HOT-MIX ASPHALT PLACEMENT

- 1. Place hot-mix asphalt base course in a lift and thicknesses indicated.
 - 2. Place hot-mix asphalt surface course in single lift.
 - 3. Spread mix at a minimum temperature of 250 deg F.
 - 4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 - 5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.
 - 6. Complete a section of asphalt base course before placing asphalt surface course.
- B. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg F.
 - 2. Average Density, Rice Test Method: 92 percent of reference maximum theoretical density in accordance with ASTM D2041/D2041M, but not less than 90 percent or greater than 96 percent.
- B. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- C. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- D. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- E. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

END OF SECTION 32 12 16

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SECTION 32 31 13 - CHAIN LINK FENCES AND GATES

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. Chain-link fences.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Fence, posts, rails, and fittings.
 - b. Chain-link fabric, reinforcements, and attachments.
- B. Shop Drawings: For each type of fence and gate assembly.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include hardware.
- C. Samples for Initial Selection: For each type of factory-applied finish.
- D. Samples for Verification: For each type of component with factory-applied finish, prepared on Samples of size indicated below:
 - 1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.
- E. Delegated-Design Submittal: For structural performance of chain-link fence and frameworks, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For professional engineer or factory-authorized service representative.

- B. Product Certificates: For each type of chain-link fence and gate.
- C. Product Test Reports: For framework strength according to ASTM F 1043, for tests performed by manufacturer and witnessed by a qualified testing agency or a qualified testing agency].
- D. Field quality-control reports.
- E. Sample Warranty: For special warranty.

1.5 FIELD CONDITIONS

- A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.6 WARRANTY

- A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure to comply with performance requirements.
 - b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 2. Warranty Period: **Five** years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01, Section "Quality Control," to design chain-link fence and gate frameworks.
- B. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.
 - 1. Design Wind Load: As indicated on Drawings.
 - a. Minimum Post Size: Determine according to ASTM F 1043 for post spacing not to exceed 10 feet for Material Group IA, ASTM F 1043, Schedule 40 steel pipe.
 - b. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

2.2 CHAIN-LINK FENCE FABRIC

- A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
1. Fabric Height: As indicated on Drawings.
 2. Steel Wire for Fabric: Wire diameter of 0.148 inch
 - a. Mesh Size: 2 inches .
 - b. Polymer-Coated Fabric: ASTM F 668, Class 1 over aluminum coated steel wire.
 - 1) Color: As selected by Architect from manufacturer's full range, according to ASTM F 934.
 - c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
 3. Selvage: Twisted top and knuckled bottom.

2.3 FENCE FRAMEWORK

- A. Posts and Rails ASTM F 1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 or ASTM F 1083 based on the following:
1. Fence Height: 42" above floor as indicated on Drawings.
 - a. Line Post: 1.9 inches in diameter
 - b. End, Corner, and Pull Posts: 2.375 inches
 2. Horizontal Framework Members: top] and bottom rails according to ASTM F 1043.
 - a. Top Rail: 1.66 inches
 3. Metallic Coating for Steel Framework:
 4. Polymer coating over metallic coating.
 - a. Color: As selected by Architect from manufacturer's full range according to ASTM F 934.

2.4 FITTINGS

- A. Provide fittings according to ASTM F 626.
- B. Post Caps: Provide for each post.
1. Provide line post caps with loop to receive tension wire or top rail.

- C. Rail and Brace Ends: For each gate, corner, pull, and end post.
- D. Rail Fittings: Provide the following:
 - 1. Top Rail Sleeves: not less than 6 inches long.
 - 2. Rail Clamps: Line and corner boulevard clamps for connecting rails to posts.
- E. Tension Bars: Aluminum length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.
- F. Truss Rod Assemblies: Mill-finished aluminum rod and turnbuckle or other means of adjustment.
- G. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
 - 1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:
 - a. Aluminum: ASTM B 211 (ASTM B 211M); Alloy 1350-H19; 0.148-inch-diameter, mill-finished wire.
- H. Finish:
 - 1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. of zinc.
 - a. Polymer coating over metallic coating.
 - 2. Aluminum: Mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for their conditions affecting performance of the Work.
 - 1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CHAIN-LINK FENCE INSTALLATION

- A. Install chain-link fencing according to ASTM F 567 and more stringent requirements specified.
- B. Post Setting: Set posts in concrete with mechanical anchors at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
- C. Line Posts: Space line posts uniformly at 96 inches o.c.
- D. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
1. Locate horizontal braces at midheight of fabric or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.
- E. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.
- F. Top and Bottom Rails: Secure to posts with fittings.
- G. Chain-Link Fabric: Apply fabric to inside of enclosing framework. Leave 1-inch bottom clearance between floor surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.
- H. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts, with tension bands spaced not more than 15 inches o.c.
- I. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at one end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric according to ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.
1. Maximum Spacing: Tie fabric to line posts at 12 inches and to braces at 24 inches
- J. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

END OF SECTION 32 31 13

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