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</tr>
<tr>
<td>F-101</td>
<td>Hennessey – Fire Protection</td>
</tr>
</tbody>
</table>

**END OF SPECIFICATION SECTION**
SECTION 00 10 00
SOLICITATION

1.0 SOLICITATION INFORMATION

Schedule

Bid Documents:

All bid documents may be obtained at the East Providence School District Director of Finance Office City Hall, East Providence, RI between 8am and 4pm Monday through Friday beginning on June 28, 2021 or by email request to jspokies@jensenhughes.com.

Pre-Bid Conference:

A pre-bid conference will be held commencing at 11:00AM on Wednesday, June 30, 2021, at Silver Spring Elementary School, 120 Silver Spring Avenue, East Providence, RI. The pre-bid conference will then continue at Agnes B Hennessey Elementary School, 75 Fort Street, East Providence, RI immediately thereafter. Attendance is strongly encouraged as this will be bidders’ opportunity to visit and familiarize themselves with the facility where they will be providing services, so that they may respond accurately to this RFP.

RFP Submission Deadline:

Friday, July 9, 2021 at 3:00PM. Late submittals will be immediately disqualified.

Requests for Information:

Requests for Information during the Bidding Period will be accepted until 5:00 p.m. on Tuesday, July 6, 2021.

Requests for information or clarification must be made electronically to the attention of jspokies@jensenhughes.com.

Answers to RFI’s received, will be forwarded electronically to all bidders who have registered and obtained a set of bid documents.

Proposals must be mailed or hand-delivered in a sealed envelope marked as follows:

Marked as:

East Providence School Department
Silver Spring ES and Hennessey ES Secure Entrances

To:

Craig Enos
East Providence School District – Director of Finance
City Hall Room 307
145 Taunton Avenue
East Providence, RI 02914-4505
Bonds
A Bid Bond in the amount of 5% of the bid must accompany each bid. Checks for Bid Security will not be accepted in lieu of a Bid Bond.

A 100% Payment and Performance Bond will be required by the awarded bidder along with all insurance documentation as required by the East Providence School Department.

Miscellaneous
The bid process and resulting contract are subject to the Rules and Regulations and General Terms and Conditions of Purchase. Submission of a bid in response to this solicitation is acknowledgement and acceptance of these Rules and Regulations and General Terms and Conditions of Purchase.

The East Providence School Department reserves the right to award on the basis of cost alone, accept or reject any or all bids, and to act in its best interest. Proposals found to be technically or substantially non-responsive at any point in the evaluation process will be rejected and not considered further. The East Providence School Department may, at its sole option, elect to require presentations(s) by bidders clearly in consideration for award.

2.0 BIDDER INSTRUCTIONS

It is the bidder’s responsibility to examine all specifications and conditions thoroughly and comply fully with specifications and all attached terms and conditions. Bidders must comply with all Federal, State, and City laws, ordinances and regulations, and meet any and all registration requirements where required for contractors as set forth by the State of Rhode Island. Failure to make a complete submission as described herein may result in a rejection of the proposal.

All costs associated with developing or submitting a proposal in response to this Request, or to provide oral or written clarification of its content shall be borne by the bidder. The East Providence School Department assumes no responsibility for these costs.

Proposals are considered to be irrevocable for a period of not less than thirty (30) days following the opening date, and may not be withdrawn, except with the express written permission of the Director of Finance. Should any bidder object to this condition, the bidder must provide objection through a question and/or complaint to the Director of Finance prior to the proposal deadline.

All pricing submitted will be considered to be firm and fixed unless otherwise indicated herein.

The bidder has full responsibility to ensure that the proposal arrives at the stated bid location prior to the deadline set out herein. The East Providence School Department assumes no responsibility for delays caused by the U.S. Postal Service or any other delivery service.

Postmarking by the due date will not substitute for actual receipt of response by the due date. Proposals arriving after the deadline may be returned, unopened, to the bidder, or may simply be declared non-responsive and not subject to evaluation, at the sole discretion of the East Providence School Department. For the purposes of this requirement, the official time and date shall be that of the clock in the Office of the City Manager’s administrative area.

It is intended that an award pursuant to this Request will be made to a prime contractor, who will assume responsibility for all aspects of the work. Joint venture and cooperative proposals will not be considered, but subcontractors are permitted, provided that their use is clearly indicated in the bidder’s proposal, and the subcontractor(s) proposed to be used are identified in the proposal.

Bidders are advised that all materials submitted to the East Providence School Department for consideration in response to this Request for Proposals shall be considered to be public records as defined in Title 38 Chapter 2 of the Rhode Island General Laws, without exception, and may be released for
inspection immediately upon request once an award has been made.

Bidders are responsible for errors and omissions in their proposals. No such error or omission shall diminish the bidder’s obligations to the East Providence School Department.

The East Providence School Department reserves the right to reject any or all proposals, or portions thereof, at any time, with no penalty. The East Providence School Department also has the right to waive immaterial defects, minor irregularities and formalities in any submitted proposal at its sole discretion. All material submitted in response to this RFP shall become the property of the East Providence School Department upon delivery to the stated bid submission location.

There will be a public bid opening immediately following the submission deadline.

3.0 OVERVIEW

The Owner (East Providence School Department) through its Owner’s Project Manager (Jensen Hughes) are soliciting bids for the Silver Spring ES and Hennessey ES Secure Entrances.

The Bid Documents, consisting of the Project Manual along with the Plans and Specifications prepared by Jensen Hughes comprises the bidding and construction documentation for this project. This Invitation to Bid provides an overview of the bidding process and logistics for this project.

4.0 SCOPE OF WORK

The complete scope of work is indicated on the bid drawings and specifications. The following information includes the project team:

Project:

East Providence School Department
Silver Spring ES and Hennessey ES Secure Entrances

Owner:

East Providence School Department
145 Taunton Avenue
East Providence, RI 02914

Project Manager:

Jensen Hughes
117 Metro Center Boulevard, Suite 1002
Warwick, RI 02886

Schedule

The contract will be awarded in July 2021 with submittal preparation, approval and materials acquisition to happen immediately thereafter. Onsite work can also start immediately upon contract award following acquisition of appropriate permits and approvals. Substantial completion is required to be achieved by December 17, 2021. Final completion is required to be achieved by January 28, 2022. Liquidated damages will be applicable for failure by the contractor to meet the substantial completion date of
December 17, 2021 and/or the final completion date of January 28, 2022. Liquidated damages will be assessed in the amount of $1,500 per day.

All parking, storage and logistic items for construction will be confined to the construction areas as shown on the Bid Documents or as otherwise agreed to between the successful bidder and the East Providence School Department. Smoking on School grounds is prohibited and failure to conform to this requirement will result in removal from the Project.

Bid Document Availability

Project Documents will be made available in electronic format through USB drives issued by the East Providence School Department.

Prevailing Wage

Local wage rates apply to this project. It is the responsibility of the Contractor before bid openings to request if necessary, any additional information on local Wage Rates for those trades-people who are not covered by the applicable local Wage Decision, but who may be employed for the proposed work under this Contract. The Contractor shall obtain the latest wage rates as issued by the Department of Labor and Training.

Collaborative for High Performance Schools

The Collaborative for High Performance Schools (CHPS) criteria will be implemented on the project. CHPS is a leading national movement with the goal of making schools better places to learn. CHPS’ mission is to facilitate the design, construction and operation of high-performance schools: environments that are not only energy and resource efficient, but also healthy, comfortable, well lit, and containing the amenities needed for a quality education. The selected contractor shall provide all material and perform all work so as to adhere to the guidelines of the CHPS program and provide the necessary submittals and other documentation required for the project to achieve CHPS certification.

Form of Contract

A lump sum contract (see attached sample contract) will be executed with the successful bidder for the construction of the entire project. The sample contract included in the bid documents will be utilized. No exception to the scope of work or contract will be considered unless such notification is given before the bid due date and within the Bid Submission.

5.0 PROJECT REQUIREMENTS & CONDITIONS

Contractors shall not order any equipment and shall not begin any work until submittals have been reviewed to the satisfaction of Jensen Hughes. Contractors shall not perform any installation prior to the receipt of a written authority to proceed from Jensen Hughes and receipt of a written permit to proceed by the East Providence Fire Department. Initial payment shall not be made until the “Pre-Installation Documentation” submittal process has been completed.

Jensen Hughes shall review these documents for the limited purposes of checking for general conformance with the design and not to determine accuracy or completeness of other details such as dimensions and quantities. Jensen Hughes shall not approve means, methods or procedures of construction or installation; nor shall they review for safety precautions.

In the event that the Contractor’s submittal package is required to be revised and re-submitted more than once due to nonconformance with this specification, illegibility of the submittal, incomplete submittals, noncompliance with the referenced local, state and national Codes, Standards and Regulations or
nonconformance with pertinent documentation relative to the project, the Contractor may be held responsible for fees associated with additional engineering review services.

6.0 INSURANCE

The vendor shall maintain and keep in force such comprehensive general liability insurance as shall protect them from claims which may arise from operations under any contract entered into with the East Providence School Department, whether such operations be by themselves or by anyone directly or indirectly employed by them.

The amounts of insurance shall be not less than $1,000,000.00 combined single limit for any one occurrence covering both bodily injury and property damage, including accidental death.

The East Providence School Department, City of East Providence and Jensen Hughes shall be named as additional insured on the vendor's General Liability Policy.

The vendor shall maintain and keep in force such Workers’ compensation insurance limits as required by the statutes of the State of Rhode Island, and Employer's Liability with limits no less than $500,000.

7.0 ACKNOWLEDGEMENT OF RISK AND HOLD HARMLESS AGREEMENT

In addition to the indemnity provisions specified in the Contract Documents and to the fullest extent permitted by law, the selected bidder, its officers, agents, servants, employees, parents, subsidiaries, partners, officers, directors, attorneys, insurers, and/or affiliates (Releasers) agree to release, waive, discharge and covenant not to sue the East Providence School Department, City of East Providence, its officers, agents, servants or employees (Releasees) from any and all liability, claims, cross-claims, rights in law or in equity, agreements, promises demands, actions and causes of action whatsoever arising out of or related to any loss, damage, expenses (including without limitation, all legal fees, expenses, interest and penalties) or injury (including death), of any type, kind or nature whatsoever, whether based in contract, tort, warranty, or other legal, statutory, or equitable theory of recovery, which relate to or arise out of the Releasers use of or presence in and/or on East Providence School Department and/or City of East Providence property. The Releasers agree to defend, indemnify and hold harmless the Releasees from (a) any and all claims, loss, liability, damages or costs by any person, firm, corporation or other entity claiming by, through or under Releasers in any capacity whatsoever, including all subrogation claims and/or claims for reimbursement, including any court costs and attorneys fees, that may incur due to Releasers use of or presence in and on East Providence School Department and/or City of East Providence property; and (b) any and all legal actions, including third-party actions, cross-actions, and/or claims for contribution and/or indemnity with respect to any claims by any other persons, entities, parties, which relate to or arise out of Releasers use of or presence in and on East Providence School Department and/or City of East Providence property.

The Releasers acknowledge the risks that may be involved and hazards connected with use of or presence in and on East Providence School Department and/or City of East Providence property but elect to provide services under any contract with the East Providence School Department and/or City of East Providence with full knowledge of such risks. Releasers also acknowledge that any loss, damage, and/or injury sustained by Releasers are not covered by Releasees insurance. Releasers agree to become fully aware of any safety risks involved with the performance of services under any contract with the East Providence School Department and/or City of East Providence and any safety precautions that need to be followed and agree to take all such precautions. The duty to indemnify and/or hold harmless the East Providence School Department and/or City of East Providence shall not be limited by the insurance required by the Contract Documents.
8.0 ADDITIONAL INSURANCE REQUIREMENTS

In addition to the insurance provisions in the Contract Documents, the liability insurance coverage, except Professional Liability, Errors and Omissions or Workers’ Compensation insurance required for performance of a contract with the East Providence School Department and/or City of East Providence shall include the East Providence School Department, City of East Providence, its divisions, officers and employees, the Architect and Project Manager as Additional Insureds but only with respect to the selected bidder’s activities under the contract. The insurance required through a policy or endorsement shall include:

- a Waiver of Subrogation waiving any right to recovery the insurance company may have against the East Providence School Department and/or City of East Providence; and
- a provision that the selected vendor’s insurance coverage shall be primary with respect to any insurance, self-insurance or self-retention maintained by the East Providence School Department and/or City of East Providence and that any insurance, self-insurance or self-retention maintained by the East Providence School Department and/or City of East Providence shall be in excess of the selected vendor’s insurance and shall not contribute.

There shall be no cancellation, material change, potential exhaustion of aggregate limits or non-renewal without thirty (30) days written notice from the selected vendor or its insurer(s) to the East Providence School Department. Any failure to comply with the reporting provision of this clause shall be grounds for immediate termination of the contract with the East Providence School Department and/or City of East Providence.

Insurance coverage required under the contract shall be obtained from insurance companies acceptable to the East Providence School Department. The selected vendor shall pay for all deductibles, self-insured retentions and/or self-insurance included hereunder.

The East Providence School Department reserves the right to consider and accept alternative forms and plans of insurance or to require additional or more extensive coverage for any individual requirement.

9.0 STATE AND FEDERAL TAXES

The City is exempt from the payment of the Rhode Island Sales Tax under the 1956 General Laws of the State of Rhode Island, 44-18-30, Paragraph 1, as amended.

The City is exempt from the payment of any excise tax or federal transportation taxes. The price bid must be exclusive of taxes and will be so construed.

10.0 PROPERTY LOST, DAMAGED OR DESTROYED

Any property or work to be provided by bidder will remain at the bidder’s risk until written acceptance by the East Providence School Department and the bidder will replace, at bidder’s expense, all property or work lost, damaged or destroyed by any cause whatsoever.

11.0 CLOSEOUT

Final payment will not be received by the Contractors until the fire sprinkler or fire alarm system has been approved by the Local Authority, all miscellaneous “punch list” items are addressed, closeout documentation has been received by the CCF and CCF demonstration training has been completed.
12.0 PROPOSAL CONTENT AND ORGANIZATION

Pricing must include all costs as specified in this solicitation. Pricing for this proposal must be indicated on the Bid Form in Section 11.0 of this document and must be submitted in a separate, sealed envelope labeled as previously stated above.

All Bid Forms must be signed.

Bidders must include on the Bid Form a list of at least four (4) references with whom they have contracted to do similar work by including the company name, telephone number, contact person, and number of years they have served this customer.

Bidders must also include an overview of their company’s experience including, but not limited to, the number of years the company has been providing these services, the size of the company (including the number of employees and locations), a description of work undertaken that is similar to what is being requested in this RFP, and, if applicable, certifications that show a knowledge of equipment that would be serviced or provided under this contract.

If any subcontractors are to be used in the performance of any work contracted for under this RFP, please list their name(s), contractor license #, address and phone number, and specific description of the subcontract work to be performed.

Four (4) copies of your proposal, one (1) original and three (3) copies, must be submitted at the time of submission. Proposals must be in the following format:

- Bid Form Company overview
- Length of time your firm has been in business
- Length of time at current address

All licensing (List types and business license number(s)), certification and permits as required in the Scope of Work

Please state any and all additions, deletions, and exceptions, if any, that you are taking to any portion of this proposal. If not addressed specifically, the East Providence School Department assumes that the bidder will adhere to all terms and conditions listed in this RFP.

13.0 PROPOSAL EVALUATION CRITERIA

The evaluation of proposals will be conducted in an expeditious time frame convenient to the East Providence School Department.

The East Providence School Department reserves the right to award on the basis of cost alone, accept or reject any or all proposals, and to otherwise act in its best interest. Further, the East Providence School Department reserves the right to waive irregularities it may deem minor in its consideration of proposals.

Proposals found to be technically or substantially non-responsive at any point in the evaluation process will be rejected and not considered further. The East Providence School Department may elect to require presentations(s) by vendors in consideration for award.

Proposals will be evaluated in two (2) phases:

1. The first phase is an initial review to determine if the proposal, as submitted, is complete. To be complete, a proposal must meet all the requirements of this RFP.

2. The second phase is an in-depth analysis and review based on criteria below and their associated weights. The following detailed criteria will be utilized in the evaluation procedure:
a. **Relevant Experience, Qualifications and Compliance with bidding requirements**: The bidder should show previous project experience in Rhode Island Educational K-12 facilities as it relates to the scope of work outlined in the bid documents. The bidder should show previous experience related to working in occupied schools during the duration of construction. Where applicable, previous project experience for the East Providence School Department should be highlighted. The bidder should provide documentation indicating that all applicable state licenses are in good standing. The bidder should provide the length of time that the organization has been in business as well as any other names that were previously utilized. The bidder should submit a proposed project schedule as well as principals and/or project managers that will be utilized on this project. The bidder should provide any additional information that illustrates the ability to perform this scope of work, in accordance with all codes and standards and in the allocated project schedule duration.

b. **References**: The bidder should provide a minimum of four (4) references that represent clients that the bidder has previously worked with that can attest to the bidder’s work product, professionalism and timeliness. The references provided should represent clients with projects similar scopes to those listed in the bid documents. References that illustrate the bidder’s experience in educational environments in occupied buildings are strongly encouraged.

c. **Cost**: The bidder should provide a firm-fixed fee for the scope of work illustrated in the bid documents. The bidder with the low bid while also providing all documents required of the bid documents will receive the full 40% of the cost component. All other bidders will be provided with a pro-rated value for the cost component of the bid evaluation.

<table>
<thead>
<tr>
<th>Evaluation Criteria</th>
<th>Weighted Value</th>
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</thead>
<tbody>
<tr>
<td>Relevant Experience, Qualifications and Compliance with bidding requirements</td>
<td>30%</td>
</tr>
<tr>
<td>References</td>
<td>30%</td>
</tr>
<tr>
<td>Cost</td>
<td>40%</td>
</tr>
</tbody>
</table>

In the event that the East Providence School Department requires further information and/or a demonstration of any equipment or process offered in any proposal, all vendors asked for same will do so at no cost to the East Providence School Department.
14.0 BID FORM

Silver Spring ES and Hennessey ES Secure Entrances

Date: _________________________________

Submitted By:
(Include Name, Address and Telephone No.):

__________________________________________________________________________

__________________________________________________________________________

Name and Remittance Address that will appear on Invoices:

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

Physical Address of Business:

__________________________________________________________________________

__________________________________________________________________________

__________________________________________________________________________

General Information
Is your firm a sole proprietorship doing business under a different name? _____Yes_____No
If yes, please indicate sole proprietorship, a name, and the name you are doing business under.

__________________________________________________________________________

__________________________________________________________________________

Is your firm incorporated? _____Yes_____No
Will any of the work spelled out in this bid be outsourced? _____Yes_____No
If so, please explain below:

__________________________________________________________________________
Have you or your firm been subject to suspension, debarment or criminal conviction by the East Providence School Department and/or City of East Providence, the State of Rhode Island, or any other jurisdiction?  
Yes:__________  No:__________

Have the East Providence School Department and/or City of East Providence and/or the State of Rhode Island ever terminated contracts with your firm for cause?  
Yes:__________  No:__________

Has your firm ever withdrawn from a contract with the East Providence School Department and/or City of East Providence and/or the State of Rhode Island during its performance?  
Yes:__________  No:__________

Have you or your firm been involved in litigation against the East Providence School Department and/or City of East Providence and/or the State of Rhode Island.  
Yes:__________  No:__________

If you answered yes to any of the foregoing, please explain the circumstances below. If you or your firm has been involved in litigation against the East Providence School Department and/or City of East Providence and/or the State of Rhode Island, please include the case caption, case number and status. (If more space is needed, please attach separate sheet and submit with the bid.)

________________________________________________________________________________________

Liquidated Damages:

The contractor acknowledges that liquidated damages will be applicable for failure by the contractor to meet the substantial completion date of December 17, 2021 and/or the final completion date of January 28, 2022. Liquidated damages will be assessed in the amount of $1,500 per day.

Initial: ____________________________

Addenda:

The following Addenda have been received. The noted modifications to the Bidding Documents have been considered and all costs are included in the Bid Sum.

Addendum #1, Dated: ____________________________

Addendum #2, Dated: ____________________________

References:

Please list at least four (4) entities with whom you have contracted to provide similar services. Preferably, references should be school departments, municipalities or State agencies or other public work; a website address should be included if available.
Reference #1

Company Name:
Contact Person:
Telephone Number:
Email Address:
Project Contract Dates:

Reference #2

Company Name:
Contact Person:
Telephone Number:
Email Address:
Project Contract Dates:

Reference #3

Company Name:
Contact Person:
Telephone Number:
Email Address:
Project Contract Dates:

Reference #4

Company Name:
Contact Person:
Telephone Number:
Email Address:
Project Contract Dates:
Silver Spring ES and Hennessey ES Secure Entrance Project Proposal

Having examined the reference RFP and its applicable documents, we propose to enter into a contract to perform services per the bid specifications for the costs listed below:

A. BASE BID

Following careful review of the Contract Documents and consisting of Instructions to Bidders, all drawings and specifications, all addenda as specified below, and having examined the site to develop a familiarization with the working conditions, the undersigned proposes to furnish materials and provide labor to perform construction work as indicated with a 100% performance bond to complete the East Providence Schools Silver Spring ES and Hennessey ES Secure Entrances for a stipulated sum of:

$__________, ________, ________.

Written Proposal Value:

The above fee excludes the fee associated with the scope of work indicated below as part of the UNIT COST BID. Undersigned agrees above stipulated sum is firm price including applicable taxes and is not subject to extras or escalator clauses.

B. UNIT COST BID

This section is not used.

C. ADD ALTERNATE

This section is not used.

D. DEDUCT ALTERNATE

This section is not used.

E. ADDENDA

This section is not used.

F. BID BOND/PERFORMANCE AND PAYMENT BOND

Cost for providing Performance and Payment Bond & Bid Bond:
Add % of Total Construction Value from $__________ to maximum of $__________.
Add % of next Total Construction Value from $__________ to maximum of $__________.
Add % of next Total Construction Value from $__________ to maximum of $__________.
### G. LABOR AND MATERIAL RATES

Labor: Unit rates are to be listed for major trades such as, but not limited to, abatement, carpenters, laborers, masons, heavy equipment operators, operators, electricians, HVAC technicians, Foreman/Supervisor for each trade, site superintendent and any other major trade employed in the completion of the Work. Labor rates shall include all overhead, profit, insurance and supervision costs, and shall not be subject to any further markups when utilized in the computation of a Change Order amount. The Owner reserves the right to request additional labor rates. Use additional pages if space provided below is not sufficient.

<table>
<thead>
<tr>
<th>Trade: Laborer Foreman</th>
<th>Rate: $___________ per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trade: Laborer</td>
<td>Rate: $___________ per hour</td>
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<td>Trade: Carpenter Foreman</td>
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<td>Trade: Carpenter</td>
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<tr>
<td>Trade: Gypsum (Tape/ sand) Foreman</td>
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<td>Trade: Electrical Foreman</td>
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<td>Trade: HVAC Foreman</td>
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<td>Trade: ATC Technician</td>
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<td>Trade: Pipe Fitter</td>
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<td>Trade: Sheet Metal Foreman</td>
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<td>Trade: Sheet Metal Worker</td>
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<tr>
<td>Trade: Painting Foreman</td>
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<td>Trade: Painter</td>
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<td>Trade: Abatement Laborer</td>
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Include additional trade labor rates below:

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Jensen Hughes  
Project No. 1JWS00127.000  
SOLICITATION  
00 10 00 -13
H. FEE FOR PROJECT CHANGES

The total mark-up for each change shall not exceed 15% (10% for overhead + 5% for profit). For changes where the work is performed totally by the Undersigned Bidder’s direct forces, the 15% mark-up shall be assigned to the Undersigned Bidder as the prime contractor. For work performed by a subcontractor(s), a maximum of 10% mark-up will be assigned to all subcontractors and/or sub-subcontractors performing work and 5% will be assigned to the Undersigned Bidder and prime contractor. Unit labor costs are all-inclusive of all OH&P and shall not be subject to further mark-up. The change order mark-ups include all overhead, coordination, bond, insurance, profit and supervision costs, and these items shall not be subject to any further markups when utilized in the computation of a Change Order amount.

For changes which add additional time to the contract completion date, the General Conditions cost impact shall be as listed on the schedule of unit rates above. The unit rate for the general conditions associated with the time extension shall be inclusive of all direct and indirect costs and fees, including but not limited to all overhead, coordination, bond, insurance, cleaning, site support, management, profit and supervision costs, and shall not be subject to any further markups when utilized in the computation of a Change Order. Unit rate shall be for one (1) additional work day.
I. OTHER CERTIFICATIONS

Undersigned agrees to execute Contract for above work for the above stipulated sum provided that he be notified of acceptance of bid within ninety (30) days after time set for the receipt of bids. Undersigned agrees to execute contract and deliver it to the Owner.

Undersigned agrees by submission of this bid that the bidder is the only interested party submitting this bid, that the Contract Documents are incorporated herein, that there is no collusion, and the contract will not be assigned with written consent of the Owner.

Undersigned certifies that included within their bid are only employees and subcontractor employees that will be employed at the worksite that have successfully completed and obtained certification in a course in construction safety and health approved by the United States Occupational Safety and Health Administration as required by the laws of the state.

Undersigned certifies, under penalty of perjury, that to the best of his knowledge and belief that:

The prices in this Bid have been arrived at independently without collusion, consultation, communication or agreement with any other Bidder or competition on any matter whatsoever for the purpose of restricting competition;

Except as may be required by law, prices quoted in this Bid have not been knowingly disclosed prior to the opening of Bids; and

No attempt has been made nor will be made by the Bidder to induce any other person, partnership, or corporation to submit or to refrain from submitting a Bid for this Project.

Undersigned represents to Owner that it has the labor, machinery, equipment, supplies, and credit to meet the schedule completion requirements.

Firm: 

Authorized Representative: 

Title: 

Signature: 

Date: 

(Corp. Seal) (Notary Seal)

END OF SPECIFICATION
SECTION 00 73 00
MINORITY BUSINESS ENTERPRISE REQUIREMENTS AND WOMEN BUSINESS ENTERPRISE PARTICIPATION REQUIREMENTS

Attached (See Appendix A) is the MBE, WBE and/or Disability Business Enterprise Participation Plan form. Bidders are required to complete, sign and submit with their overall proposal in a sealed envelope. Please complete separate forms for each MBE, WBE, and/or Disability Business Enterprise subcontractor/supplier to be utilized on the solicitation.

In accordance with RI Gen. Law § 37-14.1-1, it is the policy of the State of Rhode Island to support the fullest possible participation of firms owned and controlled by minorities (MBEs) and women (WBEs). Pursuant to §§ 37-14.1-2 and 37-14.1-6, MBEs and WBEs shall be included in all state purchasing, including, but not limited to, the procurement of goods, services, construction projects, or contracts funded in whole or in part with state funds, or funds which, in accordance with a federal grant or otherwise, the state expends or administers. MBEs and WBEs shall be awarded a minimum of ten percent (10%) of the dollar value of the entire procurement or project. MBE participation credit shall only be granted for firms duly certified as MBEs or WBEs by the State of Rhode Island, Department of Administration, Office of Diversity, Equity and Opportunity, MBE Compliance Office (MBECO).

The current directory of firms certified as MBEs or WBEs may be accessed at http://odeo.ri.gov/offices/mbeco/mbe-wbe.php or by contacting Dorinda Keene at the MBECO at (401) 574-8670 or via email at Dorinda.Keene@doa.ri.gov

END OF SPECIFICATION SECTION
Pursuant to RIGL 37-14.1 as well as the regulations promulgated thereto, the MBE Compliance Office requires that you complete the following table. Please note that these figures will be verified with the MBEs identified. If there are outstanding issues, such as retainage or a dispute, please indicate and attach supporting documentation for same. Also note that copies of invoice and cancelled checks for payment to all MBE subcontractors and suppliers are required.

**Contractor/Vendor Name:**  
**Project Name & Location:**  

<table>
<thead>
<tr>
<th>MBE/WBE Subcontractor</th>
<th>Original Contract Amount</th>
<th>Change Orders</th>
<th>Revised Contract Value</th>
<th>% Completed To Date</th>
<th>Amount Paid To Date</th>
<th>Amount Due</th>
<th>Retainage %</th>
<th>Retainage Amount</th>
<th>Explanation</th>
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I declare, under penalty of perjury, that the information provided in this verification form and supporting documents is true and correct.

________________________________________  
Signature

__________________________  
Date

________________________________________  
Printed Name

Notary Certificate:

Sworn before me this ________ day of _____________ , 20__.

________________________________________  
Notary Signature

Commission Expires
Company Name: ____________________________________________________________

Representative’s Name who administers MBE Program: ____________________________________________________________

Street Address: __________________________________________________________

City, State, Zip: ____________________________ Telephone: __________________________

Email: ____________________________ Project Location: __________________________

Bid or Project #: ____________________________ Date Bid Opened: __________________________

Description of Work: __________________________________________________________

Contract Value: ____________________________ MBE % Assigned: __________________________

Total # of All Subcontractors/Suppliers used: ______ # of MBE Subcontractors/Suppliers used: ______

<table>
<thead>
<tr>
<th>Subcontractor / Supplier</th>
<th>Dollar Award</th>
<th>Scope/Description of Work</th>
<th>RI Certified M/WBE Yes/No</th>
</tr>
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<tbody>
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</table>

Please note that all MBE/WBE firms must be certified by the RI MBE Compliance Office, and that MBE/WBE firms must self-perform 100% of the work with their own forces or subcontract to another RI certified MBE/WBE in order to receive participation credit. Vendors may count 60% of expenditures for materials and supplies obtained from an MBE certified as a regular dealer/supplier, and 100% of such expenditures obtained from an MBE/WBE certified as a manufacturer. For firms certified as a broker, you may receive MBE participation credit only for the fees and commissions charged for the procurement of the good and materials, but not the cost of the materials themselves.

The above referenced contract will not be released until this plan has been approved by the Director of the Department of Administration or its designee.

For assistance and advice in identifying MBE/WBE firms, please call the Minority Business Enterprise Compliance Office at (401) 574-8670. The directory of all certified MBE firms is also located at www.mbe.ri.gov.

Signature of Authorized Agent of Business: ____________________________ Date: ____________________________

Send Completed Form to: Dorinda Keene, Assistant Administrator - MBE
Office of Diversity, Equity and Opportunity (ODEO)
Minority Business Enterprise Compliance Office
One Capitol Hill, 3rd Floor
Providence, RI 02908
Phone: (401) 574-8670
Dorinda.Keene@doa.ri.gov

MBE Utilization Plan Form – Rev. 7/2/2020
SECTION 00 95 00
PREVAILING WAGE RATES

1.0 GENERAL

1.1 Section Includes

A. Contract description.

B. Work by Owner.

C. Work under other Contracts.

D. Owner supplied products.

E. Use of Premises.

F. Contractor Use of Premises.

G. Work Restrictions.

H. Work sequence.

I. Owner occupancy.

1.2 Contract Description

A. Work of the Project includes the Hennessey ES and Silver Spring ES Secure Entrances.

B. Perform the Work of the building under a single Contract under a stipulated sum Contract with the Owner in accordance with the Conditions of Contract.

C. Project will be constructed under a single prime contract.

1.3 Work By Owner

A. The Work under this Contract includes:

   1. Provide all labor, material, tools, transportation, equipment, supplies and services to create secure entrances at Hennessey Elementary School and Silver Spring Elementary School in accordance with Rhode Island State Building Code (RISBC), Rhode Island State Energy Conservation Code (RISECC), and all local applicable requirements.
      a. Equipment as identified in these Contract Documents.
   2. Preparation of shop drawings, product data, record drawings, and close out documents in accordance with these Contract Documents.
   3. All other items described in the Contract Documents.
1.4 Work Under Other Contracts

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.5 Use of Premises

A. Contractor shall have limited use of premises for construction operations as indicated on the Contract Documents.

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

1. Limits: Confin e construction operations to areas indicated on Drawings by Contract limits.
2. Owner Occupancy: Owner will occupy Project Site during construction
3. Driveways and Entrances: Keep driveways loading areas and entrances serving premises clear and available to Owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
   a. Schedule deliveries to minimize use of building entrances and driveways
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 Contractor Use of Premises

A. Limit use of premises for Work and for construction operations, to allow for work by other Contractors.

B. Limit access to site as directed by Owner’s Representative.

1.7 Work Restrictions

A. The Work within Hennessey and Silver Spring Elementary must be completed during 2nd shift (3:00 pm – 11:30 pm) if school is in session. All work must be coordinated so no disruption occurs to ongoing classes and other activities within the building. All work must be coordinated with Hennessey and Silver Spring Elementary School in advance. Coordination with Hennessey and Silver Spring Elementary School will be needed when working in select areas. The contractor must maintain continued work activity from the start of the project until completion, except on state of Rhode Island recognized holidays.

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

1. Notify Engineer and Owner not less than 3 days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s written permission.
1.8 Work Sequence

A. Construct the Work to accommodate the Owner’s occupancy requirements. Coordinate the construction schedule and operations with the Owner and Engineer.

1.9 Owner Occupancy

A. The Owner intends for the building to be occupied throughout construction.

B. Cooperate with the Owner to minimize conflict, and to facilitate the Owner’s operations.

C. Schedule the Work to accommodate Owner occupancy.

END OF SPECIFICATION SECTION
SECTION 01 10 00
SUMMARY OF WORK

1.0 GENERAL

1.1 Section Includes
   A. Contract description.
   B. Work by Owner.
   C. Work under other Contracts.
   D. Owner supplied products.
   E. Use of Premises.
   F. Contractor Use of Premises.
   G. Work Restrictions.
   H. Work sequence.
   I. Owner occupancy.

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         a. Equipment as identified in these Contract Documents.
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      a. Schedule deliveries to minimize use of building entrances and driveways.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 **Contractor Use of Premises**

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B. Limit access to site as directed by Owner's Representative.

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B. Cooperate with the Owner to minimize conflict, and to facilitate the Owner’s operations.

C. Schedule the Work to accommodate Owner occupancy.

END OF SPECIFICATION
SECTION 01 11 00
GENERAL REQUIREMENTS - SUMMARY

1.0 GENERAL

1.1 Summary of Work

A. Project is to include, but not limited to, all labor and materials to complete the scope of work indicated on the design drawings and specifications.

1.2 Contract Method

A. Construct the work under a single lump sum contract.

1.3 Background Checks

A. There are a growing number of Rhode Island laws that require individuals to provide a fingerprint-based national background for purposes of employment, operating a business or serving as a caregiver. Each statute dictates where individuals may obtain the national background checks: the Office of Attorney General, the Rhode Island State Police, and/or your local police department.

B. Vendors must be sure to register their company with the RI Office of Attorney General (401-274-4400) before sending employees for their fingerprint-based national background check.

C. The following must obtain national background check at the Office of Attorney General Customer Service Center, located at 4 Howard Avenue, Cranston, RI.
   1. Firefighter
   2. Medical marijuana caregiver
   3. Dept. of Child Youth and Families (DCYF) employees
   4. Public and private school employees (full time, part time, substitute teacher, school bus drivers and monitors)
   5. Third party public and private school vendors

D. Out of State: If you live out of state and require a national background check, please download and complete the forms at the bottom of http://www.riag.ri.gov/homeboxes/BackgroundChecks.php and submit with your fingerprints to the Office of Attorney General.

1.4 Existing Conditions

A. The contractor shall familiarize themselves with the building, existing conditions and other applicable information prior to the installation. Any discrepancies are to be reported to the Owner immediately.

1.5 Substitutions
A. All substitutions are to be made within 15 days after the Owner/Contractor Agreement is executed. All substitutions will be considered only when a product becomes unavailable due to no fault of the Contractor.

B. Document each request with complete data substantiating compliance of the proposed substitution with the Contract Documents.

C. Request constitutes a representation that the Contractor:
   1. Has reasonably investigated the proposed product and determined that it meets or exceeds the specified product.
   2. Will provide the same warranty for substitution as for the specified product.
   3. Will coordinate the installation and make other changes which may be required for Work to be completed in all respects.
   4. Waive claims for additional costs, which may occur.
   5. Substitutions will not be considered when they are first indicated on shop drawings or submittals without prior approval.
   6. Owner will determine the acceptability of proposed substitutions and will notify the Contractor of acceptance or rejection in writing within a reasonable time period. Decisions of the Owner as to the acceptability of the substitutions are final.

1.6 Temporary Facilities

A. If the existing building is to be used as a construction office. The location of the construction office is to be determined but will be in the immediate vicinity of the construction area.

1.7 Meetings

A. Pre-Construction Kick-Off Meeting: Following execution of the Construction Contract, the Contractor is to attend a Pre-Construction meeting to discuss the use of the site, project schedule, labor requirements and other issues related to the project.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SPECIFICATION
SECTION 01 11 15
VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS

1.0 GENERAL

1.1 Summary

A. The specification section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for this project.

1.2 Related Sections

A. The following Specification Sections contain requirements that relate to this Specification Section:
   1. Section 01 11 00 – General Requirements Summary
   2. Section 09 90 00 – Painting and Coating

1.3 General Requirements

A. The Contractor is required to implement practices and procedures to meet the project’s environmental goals, which include achieving NE-CHPS criteria. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in the related sections of the Contract Documents, are implemented to the fullest extent feasible.

1.4 References


1.5 VOC Requirements for Interior Adhesives

A. The volatile organic compound (VOC) content of adhesives, adhesive bonding primers or adhesive primers used in this project shall not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications.”
B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1.6 General

A. Unless otherwise specified below, the VOC content of all adhesive, adhesive bonding primers and adhesive primers are to be in excess of 250 grams per liter.

B. For specified building construction related applications, allowable VOC content is as follows:
1. Architectural Applications
   a. Indoor carpet adhesive 50
   b. Carpet pad adhesive 50
   c. Wood floor adhesive 100
   d. Rubber floor adhesive 60
   e. Subfloor adhesive 50
   f. Ceramic tile adhesive 65
   g. VCT and asphalt tile adhesive 50
   h. Drywall and panel adhesive 50
   i. Cove base adhesive 50
   j. Multipurpose construction adhesive 70
   k. Structural glazing adhesive 100

1.7 VOC Requirements for Interior Sealants

A. The VOC content of sealants, or sealant primers used in this project shall not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications.”

B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.
1. Sealants
   a. Architectural 250
   b. Other 420
2. Sealant Primer
   a. Architectural – Nonporous 250
   b. Architectural – Porous 775
   c. Other 750

1.8 VOC Requirements for Interior Paints

A. Paints and Primers: Paints and primers used in non-specialized interior applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) shall meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:
1. Volatile Organic Compounds
a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by the U.S. Environmental Protection Agency (EPA) Reference Test Method 24.

1) Interior Paints and Primers (non-flat) – 150 g/l
2) Interior Paints and Primers (flat) – 50 g/l

B. Anti-Corrosive and Anti-Rust Paints

1. Anti-corrosive and anti-rust paints applied to interior ferrous metal substances shall meet the VOC limitations of the Green Seal Paint Standard GS-03 requirements as follows:

a. Volatile Organic Compounds

1) The VOC concentrations (in grams per liter) of the product shall not exceed those listed by the EPA Reference Test Method 24: Anti-Corrosive and Anti-Rust Paints – 250 g/l.

1.9 VOC Requirements for Interior Coatings

A. Clear wood finishes, floor coatings, stains, sealers and shellacs applied to the interior shall meet the VOC limitations defined in Rule 113. The VOC limits defined by SCAQMD, based on 07/09/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Clear wood finishes - Varnish 350
2. Clear wood finishes – Sanding Sealers 350
3. Clear wood finishes – Lacquer 550
4. Shellac – Clear 730
5. Shellac – Pigmented 550
6. Stains 250
7. Floor Coatings 100
8. Waterproofing Sealants 250
9. Sanding Sealers 275
10. Other Sealers 200

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SPECIFICATION
SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

1.0 GENERAL

1.1 Section Includes

A. Cash or Quantity allowances.
B. Contingency allowances.
C. Schedule of values.
D. Applications for payment.
E. Warranty inspection retainage.
F. Sales tax exemption.
G. Change procedures.
H. Defect assessment.
I. Unit prices.
J. Alternates.

1.2 Contingency Allowances

A. Contractor’s costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from a Contingency Allowance.
B. Funds will be drawn from the Contingency Allowance only by Change Order.
C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.3 Schedule of Values

A. Submit Schedule of Values in duplicate, one copyrighted original and one copy, prior to commencement of work.
B. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Organize the Schedule of Values by trade and to reflect the general organization of the work. The Schedule of values and the Project Schedule must reflect each other in organization and break down.
C. Include in each line item, the amount of Allowances specified in this Section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

D. Include in the schedule of Values the following Specific Line Items:

3.01 Mobilization
   1.02 Demobilization
   1.03 Builder’s Risk Insurance
   1.04 Bond
   1.05 Coordination Drawings
   1.06 Scheduling
   1.07 Project Photographs
   1.08 Preconstruction Video, Survey, Photographs
   1.09 Mock ups / Bench Marks for each Trade
   1.10 Field Engineering, Bench Marks
   1.11 Daily Clean up in the building
   1.12 Site Clean up
   1.13 Safety Compliance
   1.14 GC Home office Overhead and Project Profit (paid proportionally to the percent complete of the project)
   1.15 Full Time Superintendent
   1.16 Field office rental and operation
   1.17 Monthly Progress Drawing updates
   1.18 Dumpsters / Trash removal
   1.19 Winter protection
   1.20 Temporary Heat
   1.21 Testing Allowance
   1.22 Contingency Allowance
   1.23 Any other Allowances from the Bid Form
   1.24 Warrantee Retainage
   1.25 Project Close out (Beyond As built Drawings)

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.4 Applications for Payment

A. Submit each application on an original copyrighted AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet, accompanied by three (3) copies.
   1. Individually sign and notarize, and emboss with notary’s official seal, the original and each of the three (3) copies.
   2. Applications not including original copyrighted AIA G702, and G703 Forms, will be rejected, and returned for re-submittal.
   3. Applications not properly signed and notarized will be rejected, and returned for re-submittal.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Provide one (1) hard copy and one (1) electronic copy of the updated construction schedule with each Application for Payment submission.
   1. Provide a statement signed by the Contractor’s firm principal certifying that there are no unidentified outstanding claims for delay.
D. Include with each monthly Application for Payment, following the first application, one (1) copy of the Certified Monthly Payroll Record for the previous month's pay period.

E. Payment Period: Submit at intervals stipulated in the Agreement.

F. Submit with transmittal letter as specified for Submittals.

G. Substantiating Data: When the Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with the Application for Payment:
   1. Record Documents as specified, for review by the Owner which will be returned to the Contractor.
   2. Affidavits attesting to off-site stored products.
   3. Construction progress schedules, revised and current.

1.5 Sales Tax Exemption

A. Owner is exempt from sales tax on products permanently incorporated in Work of the Project.
   1. Obtain sales tax exemption certificate number from Owner.
   2. Place exemption certificate number on invoice for materials incorporated in the Work of the Project.
   3. Furnish copies of invoices to Owner.
   4. Upon completion of Work, file a notarized statement with Owner that all purchases made under exemption certificate were entitled to be exempt.
   5. Pay legally assessed penalties for improper use of exemption certificate number.

1.6 Change Procedures

A. Submittals: Submit name of the individual authorized to receive change documents and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time by issuing supplemental instructions on AIA Form G710.

C. The Engineer may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required, and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within fifteen (15) days.

D. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation, and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01 60 00.

E. Stipulated Sum Change Order: Based on Proposal Request, and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by Engineer.

F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined,
execute the Work under a Construction Change Directive. Changes in the Contract Sum or Contract Time will be computed as specified for a Time and Material Change Order.

G. Construction Change Directive: The Engineer may issue a directive, on AIA Form G713 Construction Change Directive signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in the Contract Sum or Contract Time. Promptly execute the change.

H. Time and Material Change Order: Submit an itemized account and supporting data after completion of the change, within the time limits indicated in the Conditions of the Contract. The Engineer will determine the change allowable in the Contract Sum and Contract Time as provided in the Contract Documents.

I. Maintain detailed records of work done on a Time and Material basis. Provide full information required for an evaluation of the proposed changes, and to substantiate costs for the changes in the Work. Submit form “Breakdown of Hourly Rates” attached at the end of this section.

J. Document each quotation for a change in cost or time with sufficient data to allow an evaluation of the quotation. Provide detailed breakdown of costs and estimates for labor and materials including a detailed breakdown for subcontractor's or vendor's Work. Include copies of written quotations from subcontractors or vendors.

K. Change Order Forms: AIA G701 Change Order.

L. Execution of Change Orders: The Engineer will issue Change Orders for signatures of the parties as provided in the Conditions of the Contract.

M. Correlation of Contractor Submittals:
   1. Promptly revise the Schedule of Values and the Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in the Contract Time, revise sub-schedules to adjust times for any other items of work affected by the change, and resubmit.
   2. Promptly enter changes in the Project Record Documents.

1.7 Defect Assessment

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct an appropriate remedy or adjust payment.

C. The defective Work may remain, but the unit sum will be adjusted to a new sum at the discretion of the Engineer.

D. The defective Work will be partially repaired to the instructions of the Engineer, and the unit sum will be adjusted to a new sum at the discretion of the Engineer.

E. The individual Specification Sections may modify these options or may identify a specific formula or percentage sum reduction.

F. The authority of the Engineer to assess the defect and identify a payment adjustment, is final.
G. Non-Payment for Rejected Products: Payment will not be made for rejected products for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.

1.8 Alternates

A. The Contractor shall submit separate prices for the following Add Alternates as described in Section 00 10 00 and on the bid documents.

1. The contractor shall provide a separate price as bid alternate #1 to provide Armstrong Optima 3151, or engineer approved equivalent, ceiling tiles in the Library.

END OF SPECIFICATION
SECTION 01 30 00
ADMINISTRATIVE PROCEDURES

1.0 GENERAL

1.1 Section Includes

A. Site administration

B. Construction progress schedules.

C. Coordination and project conditions.

D. Preconstruction meeting.

E. Site mobilization meeting.

F. Progress meetings.

G. Pre-installation meeting.

1.2 Site Administration

A. Maintain a daily attendance log to include the names of all project employees and guests to the site. The log sheet or sheets must clearly indicate the Project Name, and the name of the General Contractor. Each line on the log should allow for the name of each employee, the employee’s job title (use terminology used by prevailing wage job title), and the name of that employee’s employer. Each guest signing the log should indicate a brief description of the reason for the visit, and that guest’s employer or organization.

1.3 Coordination and Project Conditions

A. Coordinate the scheduling, submittals, and the Work of the various Sections of the Project Manual to ensure an efficient and orderly sequence of the demolition elements.

B. Coordinate the completion and cleanup of the Work of the separate Sections in preparation for Substantial Completion.

C. Coordinate access to the site for correction of defective Work and the Work not in accordance with the Contract Documents.

1.4 Construction Progress Schedules

A. Submit initial progress schedule in duplicate within 15 days after date of established notice to proceed for Engineer to review.

B. Revise and resubmit as required.

C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
D. Submit a computerized chart with separate line for each major section of Work or operation, identifying first work day of each week.

E. Show complete sequence of construction activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by the Owner and under Allowances.

1.5 Preconstruction Meeting

A. The Engineer will schedule a meeting after contract award.

B. Attendance Required: Owner, Engineer, and Contractor.

C. Agenda:
   1. Execution of the Owner-Contractor Agreement.
   2. Submission of the executed bond and insurance certificates.
   4. Submission of a list of Subcontractors, a list of products, schedule of values, and a progress schedule.
   5. Designation of the personnel representing the parties in the Contract, and the Engineer.
   6. The procedures and processing of the field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures.
   7. Scheduling.

D. Record the minutes and distribute copies within two days after the meeting to the participants, with two copies to the Engineer, the Owner, the participants, and those affected by the decisions made.

1.6 Site Mobilization Meeting

A. The Contractor will schedule a meeting at the Project site prior to the Contractor's occupancy.

B. Attendance Required: The Owner, Engineer, Contractor, the Contractor's Superintendent, and major Subcontractors.

C. Agenda:
   1. Use of the premises by the Contractor.
   2. The Owner's requirements and partial occupancy.
   3. Construction facilities and controls provided by the Owner.
   4. Temporary utilities provided by the Owner.
   5. Security and housekeeping procedures.
   7. Application for payment procedures.
   8. Procedures for testing.
   9. Procedures for maintaining the record documents.

D. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Engineer, Owner, participants, and those affected by the decisions made.
1.7 Progress Meetings

A. Schedule and administer the meetings throughout the progress of the Work at maximum monthly intervals.

B. Make arrangements for the meetings, prepare the agenda with copies for the participants, and preside at the meetings.

C. Attendance Required: The job superintendent, major subcontractors and suppliers, the Owner, Engineer, as appropriate to agenda topics for each meeting.

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

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Engineer, Owner, participants, and those affected by the decisions made.

1.8 Pre-Installation Meeting

A. When required in the individual specification Sections, convene a pre-installation meeting at the site prior to commencing the Work of the Section.

B. Require attendance of the parties directly affecting, or affected by, the Work of the specific Section.

C. Notify the Engineer four days in advance of the meeting date.

D. Prepare an agenda and preside at the meeting:
   1. Review the conditions of installation, preparation and installation procedures.
   2. Review coordination with the related work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Engineer, Owner, participants, and those affected by the decisions made.

END OF SPECIFICATION
SECTION 01 31 50
NE-CHPS SUBMITTALS

1.0 GENERAL

1.1 Summary

A. This specification section specifies administrative and procedural requirements for submittals required to achieve the specified NE-CHPS certification.

B. Sustainable Design Intent: Comply with project requirements intended to achieve a Certified Rating, measured and documented according to the Northeast Collaborate for High Performance Schools Criteria (NE-CHPS) Version 3.1.

1.2 Related Sections

A. The following Specification Sections contain requirements that relate to this Specification Section:

   1. Section 01 10 00 – General Requirements Summary

1.3 General Requirements

A. The Contractor is required to implement practices and procedures to meet the project's environmental goals, which include achieving NE-CHPS criteria. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in the related sections of the Contract Documents, are implemented to the fullest extent feasible.

1.4 Submittal Procedures

A. NE-CHPS submittal requirements are to include submission of MATERIALS CREDITS DOCUMENTATION SHEET. Information to be supplied for this form includes, but is not limited to, the following:

   1. Cost breakdowns for materials included in the contractor’s or subcontractor’s work. Cost breakdowns include total cost plus labor, equipment and material costs.
   2. The amount of salvaged, refurbished or reused materials and products.
   3. The amount of recycled content in the supplied products, with percentages broken down to indicate post-consumer and pre-consumer percentages.
   4. The location of the raw materials extracted, harvested, or recovered and then used to manufacture the supplied products.
   5. The manufacture location for the supplied products.

B. Submit Letters of Certification, provided from the product manufacturer on the manufacturer’s letterhead, to verify the product information supplied for the MATERIALS CREDITS DOCUMENTATION SHEET.
C. Submit Product Data Sheets for materials that meet the NE-CHPS Building Performance criteria.

D. Submit certification required for Construction Waste Management, Construction IAQ Management and Construction Pollution Controls.

E. Submit Material Safety Data Sheets (MSDS) for all applicable products.

F. Submittals shall be provided in approved NE-CHPS format.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SPECIFICATION
SECTION 01 35 20
INDOOR AIR QUALITY MANAGEMENT

1.0 GENERAL

1.1 Summary

A. Section includes special requirements for Indoor Air Quality (IAQ) management during construction operations.
   1. Control of emissions during construction.
   2. Moisture control during construction.

B. Procedures for testing baseline IAQ. Baseline IAQ requirements specify maximum indoor pollutant concentrations for acceptance of the facility.

1.2 Definitions

A. Definitions pertaining to sustainable development as defined in ASTM E2114.

B. Adequate Ventilation: Ventilation, including, air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of particulates, dust, fumes, vapors or gases.

C. Hazardous Materials: Any material that is regulated as a hazardous material in accordance with 49 CFR 173, requires a Material Safety Data Sheet (MSDS) in accordance with 29 CFR 1910.1200.

D. Indoor Air Quality (IAQ): The composition and characteristics of the air in an enclosed space that affect the occupants of that space. The indoor air quality of a space refers to the relative quality of air in the building with respect to the contaminants and hazards and is determined by the level of indoor air pollution and other characteristics of the air.

E. Interior Final Finishes: Materials and products that will be exposed at interior, occupied spaces including flooring, wallcovering, finish carpentry and ceilings.

F. Packaged Dry Products: Materials and products that are installed in dry form and are delivered to the site in manufacturer’s packaging including carpets, resilient flooring, ceiling tiles and insulation.

G. Wet Products: Materials and products installed in wet form, including paints, sealants, adhesives, special coatings, and other materials which require curing.

1.3 Preconstruction Meeting

A. Following award of Contract and prior to commencement of project work, the Contractor is required to schedule a meeting with the Owner and project team to discuss the proposed IAQ management plan.
1.4 **Submittals**

A. IAQ Management Plan is to be provided prior to preconstruction meeting and is required to include the following information:
   1. Procedures for control of emissions during construction
   2. Procedures for moisture control during construction

B. Product Data:
   1. Product data for filtration media used during construction and during operations.
   2. Submit air pressure difference maps for mode of operation of HVAC.
   3. Material Safety Data Sheets
   4. Inspection test reports.

2.0 **PRODUCTS**

Not Applicable

3.0 **EXECUTION**

3.1 **IAQ Management – Emissions Control**

A. During construction operations, follow the recommendations in SMACNA IAQ Guidelines for Occupied Buildings under Construction.

B. HVAC Protection
   1. Seal return registers during construction
   2. Provide temporary exhaust during construction operations

C. Source Control – provide low and zero VOC materials as specified.

D. Pathway Interruption – isolate areas of work as necessary to prevent contamination of clean or occupied spaces. Provide pressure differentials, as required, to protect clean or occupied spaces.

E. Housekeeping – during construction, maintain project and building products and systems to prevent contamination of building spaces.

F. Temporary Ventilation – provide and ACH (air changes per hour) of 1.5 or more and as follows:
   1. Provide minimum 48-hour pre-ventilation of packages dry products prior to installation. Remove from packaging and ventilate in a secure, dry and ventilated space.
   2. Provide adequate ventilation during and after installation of interior wet products and interior final finishes.

G. Scheduling – schedule construction operations involving wet products prior to packaged dry products to the greatest extent possible.

H. Flush-Out – After the conclusion of construction, and prior to occupancy, perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60-degrees F and relative humidity no greater than 60%.

**END OF SPECIFICATION**
SECTION 01 40 00
QUALITY REQUIREMENTS

1.0 GENERAL

1.1 Section Includes

A. Quality control and control of installation.
B. Verification of Credentials and Licenses.
C. Tolerances
D. References.
E. Mock-up requirements.
F. Testing and inspection services.
G. Manufacturers’ field services.

1.2 Quality Control and Control of Installation

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of the specified quality.
B. Comply with the manufacturers’ instructions, including each step in sequence.
C. When the manufacturers’ instructions conflict with the Contract Documents, request a clarification from the Engineer before proceeding.
D. Comply with the specified standards as a minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Perform the Work by persons qualified to produce the required and specified quality.
F. Verify that field measurements are as indicated on the Shop Drawings or as instructed by the manufacturer.
G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 Verification of Credentials and Licenses

A. An element of this oversight process is the verification that persons employed on the project site have appropriate and current credentials and licenses in their possession, at the project site, for the work they are performing.
B. Be forewarned that state resident inspectors will be checking for verification of credentials and licenses of both union and non-union persons, in their onsite inspections.
C. State resident inspectors will also be reviewing Contractor’s Certified Monthly Payroll Records for conformance with RI State Prevailing Wage Rate requirements.

D. Those persons without the appropriate credentials and licenses will be subject to dismissal from the project site.

1.4 Tolerances

A. Monitor the fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with the manufacturers' tolerances. When the manufacturers’ tolerances conflict with the Contract Documents, request a clarification from the Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.5 References

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by the date of issue current on the date of the Contract Documents, except where a specific date is established by code.

C. Obtain copies of the standards where required by the product specification Sections.

D. When the specified reference standards conflict with the Contract Documents, request a clarification from the Engineer before proceeding.

E. Neither the contractual relationships, duties, or responsibilities of the parties in the Contract, nor those of the Engineer, shall be altered from the Contract Documents by mention or inference otherwise in reference documents.

1.6 Mock-Up Requirements

A. Tests will be performed under the provisions identified in this Section and identified in the respective product specification Sections.

B. Assemble and erect the specified items with the specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where the mock-up has been accepted by the Engineer and is specified in the product specification Sections to be removed, remove the mock-up and clear the area when directed to do so by the Engineer.

1.7 Testing and Inspection Services

A. The Contractor will submit the name of an independent firm to the Engineer for approval by the Owner, to perform the testing and inspection services.
B. The independent firm will perform the tests, inspections and other services specified in the individual specification Sections and as required by the Engineer.
   1. Laboratory: Authorized to operate in the location in which the Project is located.
   2. Laboratory Staff: Maintain a full time registered Engineer on staff to review the services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either the National Bureau of Standards or to the accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off the project site. Perform off-site testing as required by the Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Engineer and the Contractor, in duplicate, indicating the observations and results of tests and indicating the compliance or non-compliance with Contract Documents.

E. Cooperate with the independent firm; furnish samples of the materials, design mix, equipment, tools, storage, safe access, and the assistance by incidental labor as requested.
   1. Notify the Engineer and the independent firm 24 hours prior to the expected time for operations requiring services.
   2. Make arrangements with the independent firm and pay for additional samples and tests required for the Contractor's use.

F. Testing and employment of the testing agency or laboratory shall not relieve the Contractor of an obligation to perform the Work in accordance with the requirements of the Contract Documents.

G. Re-testing or re-inspection required because of a non-conformance to the specified requirements shall be performed by the same independent firm on instructions by the Engineer.

H. Payment for the re-testing or re-inspection will be charged to the Contractor by deducting the testing charges from the Contract Sum.

I. Agency Responsibilities:
   1. Test samples of mixes submitted by the Contractor.
   2. Provide qualified personnel at the site. Cooperate with the Engineer and the Contractor in performance of services.
   3. Perform specified sampling and testing of the products in accordance with the specified standards.
   4. Ascertain compliance of the materials and mixes with the requirements of the Contract Documents.
   5. Promptly notify the Engineer and the Contractor of observed irregularities or non-conformance of the Work or products.
   6. Perform additional tests required by the Engineer.
   7. Attend the preconstruction meetings and the progress meetings.

J. Agency Reports: After each test, promptly submit two copies of the report to the Engineer and to the Contractor. When requested by the Engineer, provide an interpretation of the test results.

K. Include the following:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in the Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.

L. Limits On Testing Authority:
   1. Agency or laboratory may not release, revoke, alter, or enlarge on the requirements of the Contract Documents.
   2. Agency or laboratory may not approve or accept any portion of the Work.
   3. Agency or laboratory may not assume any duties of the Contractor.
   4. Agency or laboratory has no authority to stop the Work.

1.8 Manufacturers’ Field Services

A. When specified in the individual specification Sections, require the material or Product suppliers, or manufacturers, to provide qualified staff personnel to observe the site conditions, the conditions of the surfaces and installation, the quality of workmanship, the start-up of equipment, or test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Submit the qualifications of the observer to the Engineer 30 days in advance of the required observations. Observer, subject to approval of Engineer.

C. Report the observations and the site decisions or instructions given to the applicators or installers that are supplemental or contrary to the manufacturers’ written instructions.

END OF SPECIFICATION
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

1.0 GENERAL

1.1 Section Includes

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary heating.
   4. Temporary cooling.
   5. Temporary ventilation.
   6. Telephone service.
   7. Facsimile service.
   8. Temporary water service.

B. Construction Facilities:
   1. Field offices and sheds.
   2. Vehicular access.
   3. Parking.
   4. Progress cleaning and waste removal.

C. Temporary Controls:
   2. Fire detection.
   3. Water control.
   4. Dust control.
   5. Erosion and sediment control.
   6. Noise control.
   7. Pest control.
   8. Pollution control.
   9. Rodent control.

1.2 Summary

A. This section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.3 Temporary Electricity

A. The Owner will pay the cost of energy used. Exercise measures to conserve energy. Utilize the Owner’s existing power service

1.4 Temporary Lighting for Construction Purposes

A. Permanent building lighting maybe utilized during construction.
1.5 Temporary Heating
   A. Existing facilities shall be used.

1.6 Temporary Cooling
   A. Existing facilities shall be used.

1.7 Temporary Ventilation
   A. Utilize the existing ventilation equipment. Extend and supplement the equipment with temporary fan units as required to maintain clean air for construction operations.

1.8 Telephone Service
   A. Not applicable.

1.9 Facsimile Service
   A. Not applicable.

1.10 Temporary Water Service
   A. The Owner will pay the cost of temporary water. Exercise measures to conserve energy. Utilize the Owner's existing water system, extend and supplement with temporary devices as needed to maintain the specified conditions for construction operations.

1.11 Temporary Sanitary Facilities
   A. The existing designated facilities located within each building may be used during construction operations. Maintain daily in a clean and sanitary condition.
   B. At the end of construction, return the facilities to the same or better condition as the original condition.

1.12 Field Offices and Sheds
   A. A designated existing space within the building may be used for field offices upon approval of Owner.

1.13 Vehicular Access
   A. Location as approved by the Owner.
   B. Provide unimpeded access for emergency vehicles. Maintain 20-foot width driveways with turning space between and around combustible materials.
   C. Provide and maintain access to fire hydrants and control valves free of obstructions.
   D. Use designated existing on-site roads for construction traffic.

1.14 Parking
   A. Locate as approved by the Owner.
B. When site space is not adequate, arrange through the Owner for additional off-site parking.

C. Use of designated existing on-site streets and driveways for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

D. Use of designated areas of existing parking facilities by construction personnel is permitted.

E. Do not allow heavy vehicles or construction equipment in parking areas.

1.15 Progress Cleaning and Waste Removal

A. Maintain areas free of waste materials, debris, and rubbish. Maintain the site in a clean and orderly condition. Building must be clear of all debris at conclusion of each day. The building will remain a fully occupied building for the duration of the project.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean the interior areas prior to the start of surface finishing and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from the site periodically, weekly, or daily, as necessary to prevent an on-site accumulation of waste material, debris, and rubbish, and dispose off-site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.16 Security

A. Security Program:
   1. Protect the Work, the existing premises, or the Owner's operations from theft, vandalism, and unauthorized entry.
   2. Initiate the program in coordination with the Owner's existing security system at the mobilization.
   3. Maintain the program throughout the construction period until Owner occupancy.

B. Entry Control:
   1. Restrict the entrance of persons and vehicles into the Project site, or the existing facilities.
   2. Allow entrance only to authorized persons with the proper identification.
   3. Maintain a log of workers and visitors, make available to the Owner on request.
   4. Coordinate the access of the Owner's personnel to the site in coordination with the Owner's security forces.

1.17 Fire Detection

A. Each day, before beginning any construction operations that can potentially trigger the existing fire alarm detection system, the Contractor is permitted to temporarily disconnect the system in the specific areas of construction, for as long as may be necessary. The Owner shall be notified each time the existing system is disabled.

B. Failure to so notify the Owner will subject the Contractor to a monetary fine for each occurrence, should the fire detection system be activated inadvertently by a construction activity.
1.18 **Water Control**
   A. Grade the site to drain. Maintain excavations free of water. Provide, operate, and maintain the pumping equipment.
   B. Protect the site from puddling or running water. Provide water barriers as required to protect the site from soil erosion.

1.19 **Dust Control**
   A. Execute the Work by methods to minimize raising dust from construction operations.
   B. Provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.20 **Erosion and Sediment Control**
   A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
   B. Minimize the amount of bare soil exposed at one time.
   C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.
   D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
   E. Periodically inspect the earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.21 **Noise Control**
   A. Provide methods, means, and facilities to minimize noise produced by the construction operations.

1.22 **Pest Control**
   A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work, or entering the facility.

1.23 **Pollution Control**
   A. Provide methods, means, and facilities to prevent the contamination of soil, water, and the atmosphere from discharge of noxious, toxic substances, and pollutants produced by the construction operations.

1.24 **Rodent Control**
   A. Provide methods, means, and facilities to prevent rodents from accessing or invading the premises.

**END OF SPECIFICATION**
SECTION 01 60 00
PRODUCT REQUIREMENTS

1.0 GENERAL

1.1 Section Includes

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

1.2 Products

A. Products: Means new material, machinery, components, fixtures, or systems forming the Work; but does not include the machinery or equipment used for the preparation, fabrication, conveying, or erection of the Work. Products may include the existing materials or components required or specified for reuse.

B. Furnish products of qualified manufacturers suitable for the intended use. Furnish products of each type by a single manufacturer unless specified otherwise.

C. Do not use materials and equipment removed from the existing premises, except as specifically permitted by the Contract Documents.

D. Furnish interchangeable components of the same manufacturer for the components being replaced.

1.3 Product Delivery Requirements

A. Transport and handle products in accordance with the manufacturer's instructions.

B. Promptly inspect shipments to ensure that the products comply with the requirements, the quantities are correct, and the products are undamaged.

C. Provide equipment and personnel to handle the products by methods to prevent soiling, disfigurement, or damage.

1.4 Product Storage and Handling Requirements

A. Store and protect the products in accordance with the manufacturers' instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to the product.
D. For exterior storage of fabricated products, place on sloped supports above the ground.

E. Provide bonded off-site storage and protection when the site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent the condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store the products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of the products to permit access for inspection. Periodically inspect to verify that the products are undamaged and are maintained in acceptable condition.

1.5 Product Options

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of the manufacturers named and meeting the specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.6 Product Substitution Procedures

A. Instructions to Bidders specify the time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.

B. Substitutions may be considered only when a product becomes no longer in production following the date of receipt of the Purchase Order for this Contract. Submit certification both that specified product was carried in Bid and is no longer obtainable.

C. Document each request with complete data substantiating the compliance of a proposed Substitution with the Contract Documents.

D. A request constitutes a representation that the Bidder:
   1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the Substitution as for the specified Product.
   3. Will coordinate the installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse the Owner and the Engineer for review or redesign services associated with re-approval by the authorities having jurisdiction.
E. Substitutions will not be considered when they are indicated or implied on the Shop Drawing or Product Data submittals, without a separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure, If Permitted Following Contract Award:
   1. Submit three copies of a request for Substitution for consideration, no later than 20 working days following date of receipt of the Purchase Order for this Contract. Limit each request to one proposed Substitution.
   2. Submit the Shop Drawings, Product Data, and the certified test results attesting to the proposed product equivalence. The burden of proof is on the proposer.
   3. The Engineer will notify the Contractor in writing of a decision to accept or reject the request.

END OF SPECIFICATION
SECTION 01 70 00
EXECUTION REQUIREMENTS

1.0 GENERAL

1.1 Section Includes

A. Examination.
B. Preparation.
C. Protection of adjacent construction.
D. Cutting and patching.
E. Special procedures.
F. Progress cleaning and waste removal.
G. Final cleaning.
H. Starting and adjusting of systems.
I. Demonstration and Instructions.
J. Testing, adjusting and balancing.
K. Protecting Installed Construction.

1.2 Examination

A. Acceptance of Conditions:
   1. Verify that existing applicable site conditions, substrates, or substrate surfaces are acceptable or meet specific requirements of individual specifications Sections, for subsequent Work to proceed.
   2. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
   3. Examine and verify specific conditions described in individual specifications Sections.
   4. Verify that utility services are available, of correct characteristics, and in correct locations.
   5. Beginning of new Work, that relies upon the quality and proper execution of Work of a preceding trade, means acceptance of that preceding Work as appropriate for the proper execution of subsequent Work.
   6. Acceptance of preceding Work that can be shown later to have adversely affected proper performance of new Work may result in removal and repeat performance of all Work involved at no cost to the Owner.

1.3 Preparation

A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply substrate primer, sealer, or conditioner, required or recommended by manufacturer, prior to applying any new material or substance in contact or bond.

D. Prior to the application, installation, or erection of any products and product components, perform any other preparatory operations, or surface or substrate modifications, as may be specified or directed by product manufacturers.

1.4 Protection of Adjacent Construction

A. Protect existing adjacent properties and provide special protection where specified in individual Specification Sections.

B. Provide protective coverings at wall, projections, jambs, sills, and soffits of existing openings.

C. Protect existing finished floors, stairs, and other existing surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

D. Repair adjacent properties damaged by construction operations to original condition to the satisfaction of the Owner

E. Prohibit unnecessary traffic from existing landscaped areas.

F. Restore grassed landscaped areas damaged by construction operations to full healthy growth, by installing loam and sod to the requirements, and under the supervision of, the Owner.

1.5 Cutting and Patching

A. Employ original, or skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements which affect:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   5. Existing construction, or Work of separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods that will avoid damage to other Work and provide proper surfaces to receive patching and finishing.

E. Cut masonry, concrete, and other rigid materials using masonry saw or core drill.

F. Restore Work with new Products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetration of fire rated, partitions, ceiling, or floor construction completely seal voids with fire rated or fire-resistant material in accordance with Section 07840, to full thickness of the penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

K. Identify any hazardous substance or conditions exposed during the Work to the Engineer for decision or remedy.

1.6 Special Procedures

A. Materials: As specified in product Sections; match existing with new products, or salvaged products as appropriate, for patching and extending work.

B. Employ skilled and experienced installer to perform alteration work.

C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

D. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

E. Remove debris and abandoned items from area and from concealed spaces.

F. Prepare surface and remove surface finishes to provide installation of new Work and finishes.

G. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

H. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring products and finishes to original or specified condition.

I. Refinish existing visible surfaces to remain in renovated rooms and spaces to specified condition for each material, with a neat transition to adjacent finishes.

J. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

K. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Engineer for review.

L. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition to Engineer for review.

M. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

N. Patch or replace portions of existing surfaces which are damaged, or showing other imperfections.

O. Finish the surfaces as specified in individual product Sections, or as indicated on the Drawings.
1.7 Progress Cleaning and Waste Removal

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site periodically or weekly and dispose of off-site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.8 Final Cleaning

A. Execute final cleaning of areas affected by the Work prior to final project assessment.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition using cleaning materials appropriate to the surface and material being cleaned.

D. Clean or replace filters of operating equipment as directed by Engineer.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.9 Starting And Adjusting Of Systems

A. Coordinate schedule for starting and adjusting of various equipment and systems.

B. Notify Engineer and Owner seven days prior to starting and adjusting of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute starting and adjusting under supervision of responsible Contractor's personnel or manufacturer's representative, in accordance with manufacturer's instructions.

G. Adjust operating Products and equipment to ensure smooth and unhindered operation.
H. When specified in individual specifications Section, require manufacturer to provide authorized representative to be present at the site to inspect, check, and approve equipment or system installation prior to starting, and to supervise placing of equipment or system in operation.

I. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.10 Demonstration and Instructions

A. Demonstrate operation and maintenance of Products to Owner’s personnel two weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manuals with Owner’s personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled or agreed upon times, at equipment or system location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.11 Testing, Adjusting, And Balancing

A. Submit, for the Owner’s approval, the name of an independent firm to perform testing, adjusting, and balancing.

B. The independent firm will perform services specified in individual specifications Sections.

C. Reports will be submitted by the independent firm to the Engineer and the Owner indicating observations and test results, indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

1.12 Protecting Installed Construction

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Repair or replace installed Work damaged by construction operations, as directed by the Engineer.

END OF SPECIFICATION
SECTION 02 82 00
ASBESTOS REMEDIATION

1.0 GENERAL

1.1 Related Documents

A. All of the Contract Documents, including Drawings, General Conditions and other requirements apply to this project.

B. Known hazardous materials related to this project are limited to 10% chrysotile located on the underside of the exterior soffit as indicated in the attached report.

1.2 Asbestos Procedures

A. There is known existing asbestos containing materials (ACM) in the existing building as identified in the attached report. The Contractor shall formally notify each sub-contractor that there are reports included for review.

B. Unknown and inaccessible ACM may be encountered during the project. Where the Contractor encounters discover or encounter ACM during the scope of work the Contractor shall notify the Owner immediately. Action should be taken immediately to reduce, control or eliminate the risk of exposure of contractors and the public to ACM.

C. Responsible Person: The Contractor is required to designate one (1) qualified on-site employee to be in charge of coordination with the project team and the Contractor with regards to the ACM.

D. Responsibility for Hazardous Materials Discovery: It is the sole responsibility of the Contractor and sub-contractors to undertake whatever measures and methods of procedures are necessary to appropriately safeguard the health and safety of all workers and members of the public with respect to any ACM discovery with the project work.

E. Indemnification: To the fullest extent permitted by law, the Contractor and sub-contractor shall indemnify and hold harmless by the Owner and project team and their agents and employees from and against any claims, damages, losses and expenses including, but not limited to, attorney's fees arising out of or relating to an such claim, damage, loss or expense if attributable to bodily injury, sickness, disease or death, or to damage to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and is caused in whole or part by any negligent act or omission of the Contractor and sub-contractor anyone directly or indirectly employed by any of them or anyone whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

1.3 Lead Containing Surface Coatings and Building Components

A. The Contractor and sub-contractor shall be made aware that Lead Based Paints, other surface coatings, and building components may exist throughout the building. OSHA’s Lead Standard for the Construction Industry, Tile 29 Code of Federal Regulations 1926.62, covers lead in a variety of forms, including metallic lead, all inorganic lead components, and organic lead soaps. OSHA’s
lead in construction standard applies to all construction work where an employee may be exposed to lead. All work related to construction, alteration, or repair, including painting, is included. In construction, lead was used in many different types of building component, surfacing, coatings and applications including, but not limited to, roofs, sidings/surfaces, tank linings, and electrical conduits, plumbing fixtures, pipes and waste lines, soft solder, used chiefly for soldering tinplate and copper pipe joints, is an alloy of lead and tin, paint, varnish, shellac and other surface coating materials. Construction projects vary in their scope and potential for exposing workers to lead and other hazards. Due to the age of the building, it is assumed that there may be lead-containing building materials and surface coatings located within the interior of the building. It is the Contractor’s responsibility to protect their employees from lead exposures and to prevent the release of lead into the environment. Contractor will be responsible to follow all local, state and federal, RI Department of Environmental Management (RIDEM), Occupational and Safety and Health Administration (OSHA), and Environmental Protection Administration rules, regulations and laws concerning lead in construction activities.

B. The Contractor and respective sub-contractors are solely responsible for means and methods and techniques used for demolition.

C. The Contractor and sub-contractor shall at his own cost and expense comply with all laws, ordinance, rules and regulations or Federal, State, Regional and Local authorities during demolition, prepping, sanding, cutting, burning, scraping, paint over, grinding and regarding handling, storing and disposing of demolition/renovation debris.

1.4 Other

A. The Contractor shall be made aware that other hazardous materials may be found inside the building.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SPECIFICATION
ATTACHMENT A: ASBESTOS MATERIAL REPORT
June 2, 2021

East Providence School Department
Attn: Mr. Anthony Feola
145 Taunton Ave.
East Providence, RI 02914

Re: Limited Asbestos Sampling Report for Silver Spring and Hennessey Elementary Schools.

Mr. Feola:

Enclosed are the analytical results of the asbestos bulk samples collected by Environmental Consulting and Management (ECM) from the exterior main entryways of Silver Spring and Hennessey Elementary Schools in East Providence, RI. The inspection consisted of collecting accessible suspect materials in support of the upcoming renovations. Renovation work is slated to impact the exterior side of the main entryways. Windows, doors, caulkling, brick, mortar and soffits were all evaluated during this inspection work.

**Asbestos Report:**

Suspect materials were analyzed for asbestos content utilizing Polarized Light Microscopy (PLM) in accordance with Environmental Protection Agency (EPA) method 600/R-93/116. In addition to collection, location of the samples has also been denoted within this report. Please refer to **Attachment 1** for the analytical results. Below is a chart of the samples collected.

<table>
<thead>
<tr>
<th>Building</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Asbestos %</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver Spring</td>
<td>SLV-1A, 1B, 1C</td>
<td>Caulking around outer frame of window/door</td>
<td>Front Entry around outer frame of window and doors</td>
<td>5% Chrysotile</td>
<td>Approx 2sf</td>
</tr>
<tr>
<td></td>
<td>SLV-2A, 2B</td>
<td>Caulking on inner window/door frame</td>
<td>Inner window and doors</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>SLV-3A, 3B, 3C</td>
<td>Mortar</td>
<td>Front Entry Brick and Mortar Facade and Walls</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>SLV-4A, 4B, 4C</td>
<td>Soffit</td>
<td>Underside of soffit front entry of building</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td>Hennessey</td>
<td>H-1A, 1B, 1C</td>
<td>Mortar in between glass blocks</td>
<td>Left Side of Entry</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td>Elementary</td>
<td>H-2A, 2B, 2C</td>
<td>Caulking</td>
<td>In between glass block and brick</td>
<td>3% Chrysotile</td>
<td>1.5sf</td>
</tr>
</tbody>
</table>

181 Amaral Street
Riverside, RI 02915

O: 401.438.1360
F: 401.438.1316

www.ecmne.com
<table>
<thead>
<tr>
<th>Building</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Asbestos %</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-3A, 3B, 3C</td>
<td></td>
<td>Casulking</td>
<td>On metal door frames to brick</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td>H-4A, 4B, 4C</td>
<td></td>
<td>Caulking</td>
<td>Underside of soffit where it meets brick</td>
<td>3% Chrysotile</td>
<td>1sf</td>
</tr>
<tr>
<td>H-5A, 5B</td>
<td></td>
<td>Mortar</td>
<td>Brick mortar</td>
<td>None Detected</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Asbestos Conclusion:**

**Silver Spring:** There is approximately 2sf of asbestos containing caulking located around the outer door frame at the front entry.

**Hennessey Elementary:** Asbestos containing caulking was identified around the outer edge of the glass block window, where the block meets the brick and mortar. In addition asbestos caulking was observed on the underside of the soffit where it meets the brick and mortar. ECM estimates there to be less than 3sf of this material present.

Regulatory Compliance: All asbestos containing caulking must be removed by trained personnel following all OSHA regulations. All waste material generated from the caulking removal must be disposed of as asbestos containing waste.

Since the amount of materials for each building is less than 3sf a plan will not have to be filed with the RI Department of Health and notification to the EPA is not required.

**Limitations:**

As the survey was limited, Environmental Consulting and Management cannot be held responsible for the identification of materials that are hidden, concealed or otherwise inaccessible.

This report was prepared under the request of East Providence Schools. This report should not be represented, reproduced, or disseminated without the written approval of Environmental Consulting and Management or East Providence Schools. No warranties other than those stated in the contract for this project are expressed or implied.

A hard copy of this report can be provided for your records via mail upon request. If you have any further questions feel free to contact myself at 401-304-6614.

Sincerely,

Environmental Consulting & Management

Joseph M. Lepore
ECM Project Manager
RI Inspector No. Al0661

181 Amaral Street
Riverside, RI 02915

O: 401.438.1360
F: 401.438.1316

www.ecmne.com
<table>
<thead>
<tr>
<th>Silver Spring Elementary School – Caulking around edge of window/door assembly.</th>
<th>Hennessey Elementary – Asbestos caulking around edge of glass block</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hennessey Elementary School- Caulking under soffit</td>
<td></td>
</tr>
</tbody>
</table>
Attachment 2
Asbestos Results
Dear Joseph M. Lepore,

We at SanAir would like to thank you for the work you recently submitted. The 11 sample(s) were received on Tuesday, May 25, 2021 via FedEx. The final report(s) is enclosed for the following sample(s): SLV-1A, SLV-1B, SLV-1C, SLV-2A, SLV-2B, SLV-3A, SLV-3B, SLV-3C, SLV-4A, SLV-4B, SLV-4C.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

Sandra Sobrino
Asbestos & Materials Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:
- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:
- 11 samples in Good condition.
### Asbestos Bulk PLM EPA 600/R-93/116

<table>
<thead>
<tr>
<th>SanAir ID / Description</th>
<th>Stereoscopic Components</th>
<th>Asbestos Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLV-1A / 21025555-001</td>
<td>White Non-Fibrous Homogeneous</td>
<td>95% Other 5% Chrysotile</td>
</tr>
<tr>
<td>Caulk Around Outer Frame Of Window/Door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-1B / 21025555-002</td>
<td>White Non-Fibrous Homogeneous</td>
<td>95% Other 5% Chrysotile</td>
</tr>
<tr>
<td>Caulk Around Outer Frame Of Window/Door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-1C / 21025555-003</td>
<td>White Non-Fibrous Homogeneous</td>
<td>95% Other 5% Chrysotile</td>
</tr>
<tr>
<td>Caulk Around Outer Frame Of Window/Door</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-2A / 21025555-004</td>
<td>Black Non-Fibrous Homogeneous</td>
<td>100% Other None Detected</td>
</tr>
<tr>
<td>Caulk On Inner Window Frame</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-2B / 21025555-005</td>
<td>Black Non-Fibrous Homogeneous</td>
<td>100% Other None Detected</td>
</tr>
<tr>
<td>Caulk On Inner Window Frame</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3A / 21025555-006</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other None Detected</td>
</tr>
<tr>
<td>Mortar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3B / 21025555-007</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other None Detected</td>
</tr>
<tr>
<td>Mortar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3C / 21025555-008</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other None Detected</td>
</tr>
<tr>
<td>Mortar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-4A / 21025555-009</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other None Detected</td>
</tr>
<tr>
<td>Cement On Underside Of Soffit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-4B / 21025555-010</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other None Detected</td>
</tr>
<tr>
<td>Cement On Underside Of Soffit</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Analysis Date:** 6/1/2021

**Approved Signatory:**

**Date:** 6/1/2021
## Asbestos Bulk PLM EPA 600/R-93/116

<table>
<thead>
<tr>
<th>SanAir ID / Description</th>
<th>Stereoscopic Appearance</th>
<th>% Fibrous</th>
<th>% Non-fibrous</th>
<th>Asbestos Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLV-4C / 21025555-011</td>
<td>Grey</td>
<td>100%</td>
<td>Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Cement On Underside Of Soffit</td>
<td>Non-Fibrous Heterogeneous</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Analyst:** Brandi Moore

**Analysis Date:** 6/1/2021

**Approved Signatory:** [Signature]

**Date:** 6/1/2021
Disclaimer

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Asbestos Certifications
NVLAP lab code 200870-0
City of Philadelphia: ALL-460
PA Department of Environmental Protection Number: 68-05397
California License Number: 2915
Colorado License Number: AL-23143
Connecticut License Number: PH-0105
Massachusetts License Number: AA000222
Maine License Number: LB-0075, LA-0084
New York ELAP lab ID: 11983
Rhode Island License Number: PCM00126, PLM00126, TEM00126
Texas Department of State Health Services License Number: 300440
Commonwealth of Virginia 3333000323
Washington State License Number: C989
West Virginia License Number: LT000616
Vermont License: AL166318
Louisiana Department of Environmental Quality: 212253, Cert 05088

Revision Date: 8/14/2020
### Asbestos
**Chain of Custody**
Form 140, Rev 1, 1/20/2017

**SanAir ID Number**
21025555

**Company:** Environmental Consulting & Management Inc
**Address:** 50 Kickemuit Ave, Bristol, RI 02809

**Project #:** 210312
**Project Name:** Silver Spring Elem. School
**Date Collected:** 5/21/2020

**Collect by:** Joseph LoPresti
**Phone #:** 401-438-1360
**Fax #:** 401-438-1316
**Email:** JLoPresti@ECMNE.com

---

### Bulk
<table>
<thead>
<tr>
<th>ABB</th>
<th>PLM EPA 600/R-93/116</th>
<th><strong>Positive Stop</strong> ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABEPA</td>
<td>PLM EPA 400 Point Count</td>
<td>☐</td>
</tr>
<tr>
<td>ABB1K</td>
<td>PLM EPA 1000 Point Count</td>
<td>☐</td>
</tr>
<tr>
<td>ABBEN</td>
<td>PLM EPA NOB**</td>
<td>☐</td>
</tr>
<tr>
<td>ABBCH</td>
<td>TEM Chatsfield**</td>
<td>☐</td>
</tr>
<tr>
<td>ABTTM</td>
<td>TEM EPA NOB**</td>
<td>☐</td>
</tr>
<tr>
<td>ABQ</td>
<td>PLM Qualitative</td>
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**Available on 24-hr. to 5-day TAT**

### Air
<table>
<thead>
<tr>
<th>ABA</th>
<th>PCM NIOSH 7400</th>
<th>☐</th>
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<tbody>
<tr>
<td>ABA-2</td>
<td>OSHA w/ TWA*</td>
<td>☐</td>
</tr>
<tr>
<td>ABTEM</td>
<td>TEM AHERA</td>
<td>☐</td>
</tr>
<tr>
<td>ABATN</td>
<td>TEM NIOSH 7402</td>
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<tr>
<td>ABT2</td>
<td>TEM Level II</td>
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**Other:**

### Soil
<table>
<thead>
<tr>
<th>ABSE</th>
<th>PLM EPA 600/R-93/116 (Qual.)</th>
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<tbody>
<tr>
<td>ABSPE</td>
<td>PLM CARB 435 (LOD &lt;1%)</td>
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</tr>
<tr>
<td>ABSPI</td>
<td>PLM CARB 435 (LOD 0.25%)</td>
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<tr>
<td>ABSPI</td>
<td>PLM CARB 435 (LOD 0.1%)</td>
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### Vermiculite & Soil
<table>
<thead>
<tr>
<th>ABWA</th>
<th>TEM Wipe ASTM D-6480</th>
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<tbody>
<tr>
<td>ABDMV</td>
<td>TEM Microvac ASTM D-5755</td>
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### Dust
<table>
<thead>
<tr>
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<th>PLM EPA 600/M4-82-020</th>
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<tbody>
<tr>
<td>ABEP2</td>
<td>NY ELAP 198.1</td>
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<td>ABENY</td>
<td>NY ELAP 198.6 PLM NOB</td>
<td>☐</td>
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<tr>
<td>ABBNY</td>
<td>NY ELAP 198.4 TEM NOB</td>
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### New York ELAP
<table>
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<td>NY ELAP 198.1</td>
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</tr>
<tr>
<td>ABENY</td>
<td>NY ELAP 198.6 PLM NOB</td>
<td>☐</td>
</tr>
<tr>
<td>ABBNY</td>
<td>NY ELAP 198.4 TEM NOB</td>
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### Water
| ABHE  | EPA 100.2 | ☐ |

---

### Turn Around Times

<table>
<thead>
<tr>
<th>3 HR (4 HR TEM) ☐</th>
<th>6 HR (8 HR TEM) ☐</th>
<th>12 HR ☐</th>
<th>24 HR ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ 2 Days</td>
<td>☐ 3 Days</td>
<td>☒ 4 Days</td>
<td>☐ 5 Days</td>
</tr>
</tbody>
</table>

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### Special Instructions

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Identification/Location</th>
<th>Volume or Area</th>
<th>Sample Date</th>
<th>Flow Rate*</th>
<th>Start – Stop Time*</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLV-1A</td>
<td>Calcium around outer frame of window/door</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-1B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-1C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-2A</td>
<td>Calcium on inner window frame</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-2B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3A</td>
<td>Mortar</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-4A</td>
<td>Cement on underside of soffit</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-4B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-4C</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tbody>
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### Relinquished by

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Received by</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/21/2021</td>
<td></td>
<td></td>
<td>5/25/21</td>
<td>10:20am</td>
</tr>
</tbody>
</table>

---

If no technician is provided, then the primary contact for your account will be selected. Unless scheduled, the turnaround time for all samples received after 3 pm EST Friday will begin at 8 am Monday morning. Weekend or holiday work must be scheduled ahead of time and is charged for rush turnaround time. SanAir covers Standard Overnight FedEx shipping. Shipments billed to SanAir with a faster shipping rate will result in additional charges.
Analysis Report
prepared for
Environmental Consulting & Management Inc

Report Date: 5/28/2021
Project Name: Hennessey Elm.
Project #: 210312
SanAir ID#: 21025558
Dear Joseph M. Lepore,

We at SanAir would like to thank you for the work you recently submitted. The 14 sample(s) were received on Tuesday, May 25, 2021 via FedEx. The final report(s) is enclosed for the following sample(s): H-1A, H-1B, H-1C, H-2A, H-2B, H-2C, H-3A, H-3B, H-3C, H-4A, H-4B, H-4C, H-5A, H-5B.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

Sandra Sobrino
Asbestos & Materials Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:
- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:
- 14 samples in Good condition.
**Asbestos Bulk PLM EPA 600/R-93/116**

<table>
<thead>
<tr>
<th>SanAir ID / Description</th>
<th>Stereoscopic Components</th>
<th>% Fibrous</th>
<th>% Non-fibrous</th>
<th>Asbestos Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>H-1A / 21025558-001</strong> Mortar Inbetween Glass Block</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td><strong>H-1B / 21025558-002</strong> Mortar Inbetween Glass Block</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td><strong>H-1C / 21025558-003</strong> Mortar Inbetween Glass Block</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td><strong>H-2A / 21025558-004</strong> Caulk Inbetween Glass Block &amp; Brick</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
<td>3% Chrysotile</td>
<td></td>
</tr>
<tr>
<td><strong>H-2B / 21025558-005</strong> Caulk Inbetween Glass Block &amp; Brick</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
<td>3% Chrysotile</td>
<td></td>
</tr>
<tr>
<td><strong>H-2C / 21025558-006</strong> Caulk Inbetween Glass Block &amp; Brick</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
<td>3% Chrysotile</td>
<td></td>
</tr>
<tr>
<td><strong>H-3A / 21025558-007</strong> Caulking On Metal Frame(Door) To Brick</td>
<td>Brown Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td><strong>H-3B / 21025558-008</strong> Caulking On Metal Frame(Door) To Brick</td>
<td>Brown Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td><strong>H-3C / 21025558-009</strong> Caulking On Metal Frame(Door) To Brick</td>
<td>Brown Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
<td></td>
</tr>
<tr>
<td><strong>H-4A / 21025558-010</strong> Caulk On Underside Of Soffit, Caulk</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
<td>3% Chrysotile</td>
<td></td>
</tr>
</tbody>
</table>

**Analysis Date:** 5/28/2021

**Approved Signatory:**

Date: 5/28/2021
<table>
<thead>
<tr>
<th>SanAir ID / Description</th>
<th>Stereoscopic Appearance</th>
<th>% Fibrous</th>
<th>% Non-fibrous</th>
<th>Asbestos Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-4A / 21025558-010 Cauk On Underside Of Soffit, Cauk</td>
<td>White Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>0% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>H-4B / 21025558-011 Cauk On Underside Of Soffit, Cauk</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
<td>3% Chrysotile</td>
<td>None Detected</td>
</tr>
<tr>
<td>H-4B / 21025558-011 Cauk On Underside Of Soffit, Cauk</td>
<td>White Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>0% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>H-4C / 21025558-012 Cauk On Underside Of Soffit, Cauk</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
<td>3% Chrysotile</td>
<td>None Detected</td>
</tr>
<tr>
<td>H-4C / 21025558-012 Cauk On Underside Of Soffit, Cauk</td>
<td>White Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>0% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>H-5A / 21025558-013 Mortar</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>0% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>H-5B / 21025558-014 Mortar</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>0% Other</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

**Analyst:** Hogrefe, Sarah

**Analysis Date:** 5/28/2021

**Approved Signatory:**

**Date:** 5/28/2021
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<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Identification/Location</th>
<th>Volume or Area</th>
<th>Sample Date</th>
<th>Flow Rate*</th>
<th>Start – Stop Time*</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1A</td>
<td>Mortar in Between Glass Blocks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-1B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-1C</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>H-2A</td>
<td>Mortar in Between Glass Block &amp; Brick</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-2B</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>H-2C</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>H-3A</td>
<td>Concrete on Metal Frame (Door) to Back</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-3B</td>
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<tr>
<td>H-4A</td>
<td>Cement on underside of Soffit</td>
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<td>H-4B</td>
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<td>H-4C</td>
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</table>

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<th>Start – Stop Time*</th>
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<tbody>
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<td>H-SA</td>
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</tr>
<tr>
<td>H-SB</td>
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Special Instructions

<table>
<thead>
<tr>
<th>Replenished by</th>
<th>Date</th>
<th>Time</th>
<th>Received by</th>
<th>Date</th>
<th>Time</th>
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<tbody>
<tr>
<td></td>
<td>5/21/21</td>
<td></td>
<td>AM</td>
<td>5/25/21</td>
<td>10:00am</td>
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</table>

If no technician is provided, then the primary contact for your account will be selected. Unless scheduled, the turnaround time for all samples received after 3 pm EST Friday will begin at 8 am Monday morning. Weekend or holiday work must be scheduled ahead of time and is charged for rush turnaround time. SanAir covers Standard Overnight FedEx shipping. Shipments billed to SanAir with a faster shipping rate will result in additional charges.
SECTION 02 41 00
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Selective demolition of built site elements.
B. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS
A. Section 01 10 00 - Summary: Limitations on Contractor's use of site and premises.
B. Section 01 10 00 - Summary: Description of items to be salvaged or removed for re-use by Contractor.
C. Section 01 50 00 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
D. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.
E. Section 01 70 00 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
F. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Site Plan: Showing:
   1. Vegetation to be protected.
   2. Areas for temporary construction and field offices.
   3. Areas for temporary and permanent placement of removed materials.
C. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.
D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 QUALITY ASSURANCE
A. Demolition Firm Qualifications: Company specializing in the type of work required.
   1. Minimum of 3 years of documented experience.

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SCOPE
A. Remove concrete slabs on grade as indicated on drawings.
B. Remove other items indicated, for salvage, relocation, and recycling.
3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

D. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 in locations indicated on drawings.
C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.

D. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

F. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL
   A. Remove debris, junk, and trash from site.
   B. Remove from site all materials not to be reused on site; comply with requirements of Section 01 74 19 - Waste Management.
   C. Leave site in clean condition, ready for subsequent work.
   D. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION
SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concrete formwork.
B. Floors and slabs on grade.
C. Concrete foundation walls.
D. Concrete reinforcement.
E. Joint devices associated with concrete work.
F. Concrete curing.

1.02 RELATED REQUIREMENTS
A. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.
B. Section 32 13 13 - Concrete Paving: Sidewalks, curbs and gutters.

1.03 REFERENCE STANDARDS
A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).
C. ACI 301 - Specifications for Structural Concrete; 2016.
D. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.
H. ACI 308R - Guide to External Curing of Concrete; 2016.
I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
AE. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011 (Reapproved 2016).
AI. ASTM E154/E154M - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover; 2008a, with Editorial Revision (2013).
AK. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.
AL. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.
AO. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; 1992.
AP. COE CRD-C 513 - COE Specifications for Rubber Waterstops; 1974.
AQ. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Samples: Submit samples of underslab vapor retarder to be used.

E. Test Reports: Submit report for each test or series of tests specified.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner’s name and registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Moisture Emission-Reducing Curing and Sealing Compound, Penetrating: Provide non-prorated warranty to cover cost of flooring delamination failures for 20 years.
   1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.

PART 2 PRODUCTS

2.01 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor’s choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.
   2. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches of concrete surface.

2.02 REINFORCEMENT MATERIALS

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.
   3. Finish: Galvanized in accordance with ASTM A767/A767M, Class I, unless otherwise indicated.
   4. Finish: Epoxy coated in accordance with ASTM A775/A775M, unless otherwise indicated.

B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
   1. Form: Coiled Rolls.
   2. WWR Style: As indicated on drawings.

C. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
   3. Provide stainless steel, galvanized, plastic, or plastic coated steel components for placement within 1-1/2 inches of weathering surfaces.
2.03 CONCRETE MATERIALS
   A. Cement: ASTM C150/C150M, Type II - Moderate Portland type.
      1. Acquire cement for entire project from same source.
   B. Fine and Coarse Aggregates: ASTM C33/C33M.
      1. Acquire aggregates for entire project from same source.
   C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES
   A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
   B. Air Entrainment Admixture: ASTM C260/C260M.
   C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.
   D. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.
   E. Retarding Admixture: ASTM C494/C494M Type B.
   F. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS
   A. Underslab Vapor Retarder:
      1. Sheet Material: ASTM E1745, Class A; not less than 10 mils, stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs.
      2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations.
      3. Manufacturers:
         b. ISI Building Products; Viper VaporCheck II 15-mil (Class A): www.isibp.com/#sle.
         c. ISI Building Products; Viper VaporCheck II 10-mil (Class A): www.isibp.com/#sle.
         d. W. R. Meadows, Inc; PERMINATOR Class A - 15 mils (0.38 mm): www.wrmeadows.com/#sle.
         e. W. R. Meadows, Inc; PERMINATOR Class A - 10 mils (0.25 mm): www.wrmeadows.com/#sle.
         f. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 BONDING AND JOINTING PRODUCTS
   A. Epoxy Bonding System:
      1. Complying with ASTM C881/C881M and of Type required for specific application.
   B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
   C. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.
   D. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with rectangular or round knockout holes for conduit or rebar to pass through joint form at 6 inches on center; ribbed steel stakes for setting.

2.07 CURING MATERIALS
   A. Curing and Sealing Compound, Moisture Emission-Reducing, Penetrating: Liquid for application to newly-placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission, moisture vapor emission, and alkalinity.
      1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
2. Compressive Strength of Treated Concrete: Equal to or greater than strength after 28-day water cure when tested according to ASTM C39/C39M.
3. Comply with ASTM C309 and ASTM C1315 Type I Class A.

2.08 CONCRETE MIX DESIGN
A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 4,000 pounds per square inch.
   2. Cement Content: Minimum 564 pounds per cubic yard.
   3. Water-Cement Ratio: Maximum 40 percent by weight.
   4. Total Air Content: 3 percent, determined in accordance with ASTM C173/C173M.
   5. Maximum Slump: 4 inches plus or minus 1 inch.

2.09 MIXING
A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
B. Transit Mixers: Comply with ASTM C94/C94M.
C. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION
A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
B. Verify that forms are clean and free of rust before applying release agent.
C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
D. Prepare existing concrete surfaces to be repaired according to ICRI 310.2R, ______.
E. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
F. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
G. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Comply with ASTM E1643. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.
3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS
A. Fabricate and handle epoxy-coated reinforcing in accordance with ASTM D3963/D3963M.
B. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
C. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.04 PLACING CONCRETE
A. Place concrete in accordance with ACI 304R.
B. Place concrete for floor slabs in accordance with ACI 302.1R.
C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
D. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING
A. Locate joints as indicated on drawings.
B. Anchor joint fillers and devices to prevent movement during concrete placement.
C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
D. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.
E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES
A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 feet.
   2. Under Seamless Resilient Flooring: 1/4 inch in 10 feet.
B. Correct the slab surface if tolerances are less than specified.
C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING
A. Repair surface defects, including tie holes, immediately after removing formwork.
B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.
C. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Surfaces to Receive Thick Floor Coverings: "Wood float" as described in ACI 302.1R; thick floor coverings include quarry tile, ceramic tile, and Portland cement terrazzo with full bed setting system.
   2. Surfaces to Receive Thin Floor Coverings: "Steel trowel" as described in ACI 302.1R; thin floor coverings include carpeting, resilient flooring, seamless flooring, resinous matrix terrazzo, thin set quarry tile, and thin set ceramic tile.
   3. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
3.08 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
   1. Normal concrete: Not less than seven days.

C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
      a. Ponding: Maintain 100 percent coverage of water over floor slab areas, continuously for 4 days.
      b. Spraying: Spray water over floor slab areas and maintain wet.
      c. Saturated Burlap: Saturate burlap-polyethylene and place burlap-side down over floor slab areas, lapping ends and sides; maintain in place.
   3. Final Curing: Begin after initial curing but before surface is dry.

3.09 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

H. Slab Testing: Cooperate with manufacturer of specified moisture vapor reducing admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

I. Permeability Test: Test concrete with waterproofing admixture according to COE CRD-C 48.

3.10 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
3.11 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION
SECTION 04 50 10
MASSONERY RESTORATION

PART 1 - GENERAL

1.01 DESCRIPTION OF THE WORK:
   A. The work includes, but is not limited to:
      1. Repair and repointing of damaged areas, re-construction of indicated stone and brick work.
   B. Cleaning areas of new masonry and mortar installation.

1.02 RELATED DOCUMENTS:
   A. The General Conditions, Supplementary Conditions and applicable portions of Division 1 of the specification are a part of this section which shall consist of all labor, equipment and materials necessary to complete all masonry restoration work indicated on the drawings and herein specified.

1.03 RELATED WORK SPECIFIED ELSEWHERE:
   A. Joint Sealers – Division 7.
   B. Scaffolding and Hoisting – Division 1.

1.04 REFERENCES:
   A. The following guidelines apply to repointing, cleaning or repair of masonry on historic buildings:
         Department of the Interior, National Technical Preservation Services 1998

1.05 QUALITY ASSURANCE:
   A. Job Mock-Up (Sample Wall Panel): Prior to general initiation of masonry restoration work, but following cleaning and dismantling work, provide sample mock-up panels using materials, bond and joint tooling shown or specified for final work. Provide special features as directed for calking and contiguous work. Provide mock-up, where directed, approximately 3’ x 3’, indicating the proposed range of color, texture and workmanship to be expected in the completed work. Obtain acceptance of visual qualities of the mock-up before start of masonry restoration work. Additional panels may be required until such approval is granted. Retain approved mock-ups during construction as a standard for judging completed masonry work. Do not alter, move or destroy approved mock-up until work is completed. Provide mock-up panels for the following:
      1. Typical re-built section of chimney.
      2. Typical repointed section of chimney.
   B. Contractor Responsibility: Plan and manage a program for controlling the quality of materials and workmanship to insure that the work conforms to the Contract Documents. As a minimum, this program shall consist of selection of suitable material sources, supervision of the construction process, performance of the specified testing and certification of conformance with the Contract Documents.

1.06 SUBMITTALS:
   A. Manufacturer's Data:
      1. Submit the manufacturer's specifications and other data for each type of masonry unit and accessory required including certification that each type complies with the specified requirements. Include instructions for handling, storage, installation and protection of each. Transmit copy of each instruction to the Installer.
      2. Submit test lab results of existing mortar analysis providing as a minimum: compressive strength material mark-up by percentage and type of cement (if any found).
      3. Submit certification of mortar proportions for repointing.
      4. Submit sieve analysis of pointing aggregates.
      5. Submit testing laboratory sieve analysis of pointing aggregates.
B. Samples:
1. Submit samples of all materials for approval.
2. Submit physical sample of cast stone for quality and moulding approval.
3. Submit physical sample of replacement brick for color and texture approval.
4. Submit samples of each mortar type required. Submit pre-mixed mortar color samples, if specified. Include in each set the full range of exposed color and texture to be expected in the completed work. Architect's review will be for color and texture only. Compliance with all other requirements is the exclusive responsibility of the Contractor.

1.07 JOB CONDITIONS:
A. PROTECTION: During dismantling, cover exposed inner wythes with heavy waterproof sheeting at end of each days' work. Cover partially completed repairs when work is not in progress.
B. Extend cover a minimum of 24 inches beyond work area and hold cover securely in place.
C. Staining: Prevent grout or mortar from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.
D. Protect sills, ledges, projections and side walk below from mortar droppings.
E. Protection: Protect newly pointed joints from rain, until pointed joints are sufficiently hard to not be damaged.
F. COLD WEATHER PROTECTION
   1. Do not use frozen materials or materials mixed or coated with ice or frost. For masonry which is specified to be wetted, comply with the Brick Institute of America recommendations. Do not build on frozen work. Remove and replace masonry work damaged by frost or freezing.
   2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
   3. Remove all masonry determined to be frozen or damaged by freezing conditions.
   4. Perform the following construction procedures while the work is progression:
      a. When air temperature is from 40 to 32 degrees Fahrenheit, heat sand or mixing water to produce mortar temperatures between 40 and 120 degrees Fahrenheit.
      b. When air temperature is from 32 to 25 degrees Fahrenheit, heat sand and mixing water to produce mortar temperatures between 40 and 120 degrees Fahrenheit; maintain temperature of mortar on boards above freezing.
      c. When air temperature is from 25 to 20 degrees Fahrenheit, heat sand and mixing water to produce mortar temperature between 40 and 120 degrees Fahrenheit; maintain temperature of mortar on boards above freezing; use salamanders or other heat sources on both sides of walls or chimney under construction; use wind breaks when wind is in excess of 15mph.
   5. Perform the following protections for completed masonry and masonry not being worked on:
      a. When the mean daily air temperature is from 40 to 32 degrees Fahrenheit, protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.
      b. When mean daily air temperature is from 32 to 25 degrees Fahrenheit, completely cover masonry with weather-resistive membrane for at least 24 hours.
      c. When mean daily air temperature is from 25 to 20 degrees Fahrenheit, completely cover masonry with insulation blankets or similar protection for at least 24 hours.
      d. When mean daily temperature is 20 degrees Fahrenheit and below, maintain masonry temperature above 32 degrees Fahrenheit for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other acceptable methods.
   6. Provide a thermometer at all places where masonry work is being installed under the above conditions.
PART 2 - PRODUCTS

2.01 MATERIALS:

A. MASONRY UNITS: Manufacturer: Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

1. Brick:
   a. Size – Provide brick to match the existing, for both exterior face and interior applications. Brick shall match existing in form and dimension, color, texture, strength and absorption rate.
   b. Provide special molded shapes where existing, and for applications which cannot be sawn from the specified brick.

2. Facing Brick:
   a. Size: To match size, shape, dimension, including the distortion of existing units.
   b. Finish: Exposed face shall match color, texture and form of the existing brick. Surface irregularities shall be as prevalent as the average brick in a given 10’ x 10’ square.

3. Building (Common) Brick:
   a. Quality Standard: ASTM C 62. Grade SW for exterior exposure or where in contact with earth, Grade MW for exposed interior work and Grade NW for interior masonry which will be concealed by other work. Grade SW may be used in lieu of MW or NW, and Grade MW in lieu of NW. Brick may be “frogged” but not cored.
   b. Color and Texture: Selected from manufacturer’s standard colors and textures.

B. MORTAR:

1. The mortar for stone work and repointing where no laboratory analysis of existing materials is available, shall be over sanded Type “N” mortar in accordance with ASTM C 270, and shall conform to the following proportions; Unless super ceded by a specific laboratory analysis for a given building:
   a. Portland Cement 1.0
   b. Hydrated Lime Over .5 up to .125
   c. Not less than 2.25 nor more than 3 times the sum of the separate volumes of cementitious materials.

2. Provide analysis to match existing materials, where available.

3. Mortar Components:
   a. Sand for repointing: Provide sand conforming to ASTM C 144 to assure proper gradation and freedom from impurities; some variation may be necessary to match the original size and gradation. Sand color and texture also should match the original as closely as possible to provide the proper color match without other additives.
   b. Lime for repointing: Provide lime conforming to ASTM C 207, Type S, or Type SA, Hydrated Lime for Masonry Purposes. Provide lime is designed to assure high plasticity and water retention.
   c. Cement for repointing: Provide portland cement conforming to ASTM C 150. Provide white or gray non-staining portland cement as required to provide color match for mortars. The cement should not have more than 0.60 per cent alkali to help avoid efflorescence.
   d. Water: Provide water free from acids, alkalis, or other dissolved organic materials.

C. Materials:

1. The Contractor shall analyze the existing mortar, in the area where work is being performed, and install mortar which matches existing in color and physical properties.

2. Due to the age of the buildings, there may be more than one type of mortar installed.

3. The mortar for brickwork construction and repointing shall be mortar in accordance with ASTM C 270, and shall conform to the tested proportions.
   a. Where colored mortar is present, provide color to match existing.

4. Strength: Each class or mixture of mortar shall have a 28-day compressive strength matching the compressive strength of the original existing mortar in the structure as
determined by ASTM C 109/C 109M for mortar. Test specimens of existing mortar shall be taken from a sound and intact representative portion of the structure.

5. Special Properties: Mortar may contain admixtures, such as pigments, to match the characteristics of the original mortar. Use of all admixtures shall be subject to approval.

6. Cementitious Content of Mortar: Each class or mixture of mortar shall have a cement content matching the cement content of the original existing mortar in order to provide uniform strength, weathering characteristics, and appearance of repaired surfaces in relation to existing surfaces.

2.02 MASONRY ACCESSORIES:

A. Anchoring Devices: Provide straps, bars, bolts and rods fabricated from not less than 16 gauge sheet metal or 3/8” diameter rod stock.
   1. Flexible Anchors: Where masonry is indicated to be anchored to structural framework with flexible anchors, provide 2-piece anchors which will permit horizontal and vertical movement of masonry but will provide lateral restraint.
   2. For interior work, including devices which extend only into interior wythes of exterior masonry, fabricate from steel with mill galvanized or hot-dip coating.
   3. For devices which extend into exterior wythe, fabricate from steel with 1.5 oz. hot-dip galvanized coating, ASTM A 153, Class B2, or from Series 300 stainless steel or bronze.
   4. Masonry Veneer Anchors to existing Masonry Construction: Corrugated stainless steel ties not less than 16 gauge and not less than 1-1/4” wide and 7” long, with one end crimped for attachment to substrate with 5/16” diameter hole. Size to extend to within 3/4” of face of masonry veneer. Equal to Heckmann #187 Brick Veneer Anchor. As detailed.

B. Flashings for Masonry:
   1. Provide concealed flashings, shown to be built into masonry. Provide "metal", and "fabric" where specifically indicated; and, as follows:
      a. Metal: 16 ounce, zinc or lead coated copper.
      b. Fabricate through-wall metal flashings with deformations in both directions for integral mechanical mortar bond.
      c. Fabric: Afco Copper Fabric, Wasco "Copper-Fabric" or Phoenix Type "FCC"; 3 ounce copper bonded on sides and edges to asphalt saturated cotton fabric with asphalt mastic.

C. Miscellaneous Masonry Accessories
   1. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 of the sizes shown.
   3. Pins: Stainless steel pins of the sizes indicated.

D. Stabilization:
   1. Where indicated, provide the specified “stabilization anchors”, in a pattern to ensure that each anchor will reinforce not more than five square feet of surface. (If the anchors are determined to be required, a sketch will be issued by the Architect outlining the areas to be treated.)

PART 3 - EXECUTION

3.01 INSPECTION:

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

3.02 INSTALLATION:

A. REPAIR AND REPOINTING:
   1. Remove loose mortar and stone with a tuck grinder, to ¾” depth and repoint to a depth of 1/8” with mortar, as required to form an unbroken mortar joint. Pre-wet wall to achieve proper adhesion. Insure weathertight installation.
2. Provide only materials which match color and texture of approved mortar samples. Take care to cut out any joints with hairline cracks and repoint.

3. Immediately prior to application of mortar, dampen joints to be tuck pointed. Prior to application of pointing mortar.

4. Tightly pack mortar into joints in thin layers, approximately 1/4 inch thick maximum.

5. Allow layer to become "thumbprint hard" before applying next layer.

6. Pack final layer flush with surfaces of stone units. When mortar becomes "thumbprint hard", tool joints.

7. Joint Preparation.
   a. Remove old mortar to a minimum depth of 2 to 2-1/2 times the width of the joint to ensure an adequate bond and to prevent mortar "popouts." For most brick joints, remove the mortar to a depth of approximately 1/2 to 1 inch; for stone masonry with wide joints, remove mortar to a depth of several inches. Remove loose or disintegrated mortar beyond these minimum depths.
   b. Careful joint preparation can help limit damage to masonry units.
   c. At head joints, remove old mortar using hand chisels and mash hammer.
   d. The use of power saws or grinders shall be permitted at horizontal joints only.
   e. Thin diamond-bladed grinders may be used to cut out horizontal joints only on hard portland cement mortar. Where horizontal joints are uniform and fairly wide, use a power masonry saw to remove mortar by cutting along the middle of the joint, and removing the mortar from the sides of the joints using a hand chisel and hammer.

1) Prepare test areas, to demonstrate proficiency with power tools prior to commencing full scale operations. If the use of power tools is permitted, the contractor should establish a quality control program to account for worker fatigue and similar variables.

8. Remove mortar cleanly from the masonry units, leaving square corners at the back of the cut. Before filling, rinse the joints with a jet of water to remove all loose particles and dust. At the time of filling, the joints should be damp, but with no standing water present. For masonry walls and common brick that are extremely absorbent, continually mist surfaces with water for a few hours before repointing operation begins.

3.03 MORTAR BEDDING AND JOINTING:

A. Mortar Mixes: (As previously specified)

B. Measure and batch materials either by volume or weight, such that the required proportions for mortar can be accurately controlled and maintained. Measurement of sand by shovel will not be permitted.

C. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar.

D. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer. Use water clear and free of deleterious materials which would impair the work. Do not use mortar which has begun to set, or if more than 2-1/2 hours has elapsed since initial mixing. Re-temper mortar during 2-1/2 hour period as required to restore workability.

E. Lay stone and other solid masonry units with completely filled bed and head joint; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints. Take extreme care to fully bed fill continuous head joints in stack bond construction.

F. Joints: Provide jointing and maintain joint widths to match existing or as shown, except for minor variations required to maintain bond alignment, but in no case will vertical joints over 1/2 inch or under 1/4 inch be accepted. Drawing dimensions are generally modular. Lay to this module. If not shown, lay walls with 3/8" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise shown.

1. Concave - "Sled" type jointer, 1/2" round case-hardened or stainless steel, 16 inches minimum length, minimum 1/8" depth from wall face.

2. Raked - In joints for preparation for application of calking and sealants, and where shown.
G. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.04 REPAIR, POINTING AND CLEANING: (FOR AREAS OF "NEW" OR RE-BUILT MASONRY)

A. Remove and replace brick units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new brick to match adjoining material and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing:
   1. During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of calking or sealant compounds, if any joint is to be so treated. Joints to be exposed shall be tooled to match existing adjacent, and stippled, to approximate the original joint finish.

C. Cleaning:
   1. Clean all masonry before beginning dismantling or repair work.
   2. Coordinate with Section 04 50 11.
   3. All masonry restoration work and repair work shall be complete in a given area before commencing any window work or painting.
   4. Repaired, repointed or rebuilt masonry shall be generally cleaned after completion of other work.
   5. Clean exposed masonry surfaces by the bucket and brush hand cleaning method.
   6. If cleaning with liquid solutions, protect abutting non-masonry surfaces. As such solutions may affect the finishing of those surfaces.
   7. Clean all re-pointed areas with a low to medium pressure wash and stiff nylon bristle brushes to eliminate excess mortar and job residue as the work progresses. (NO ACIDIC CLEANING MATERIALS WILL BE PERMITTED.)

END OF SECTION
PART 1  GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall and interior wall framing.
B. Exterior wall sheathing.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood blocking and miscellaneous framing.
B. Section 07 21 00 - Thermal Insulation: Insulation within framing members.
C. Section 07 92 00 - Joint Sealants.
D. Section 09 21 16 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.
E. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
F. Section 09 22 16 - Non-Structural Metal Framing.
G. Section 09 22 36 - Lath.
H. Section 09 24 00 - Cement Plastering.

1.03 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2016, with Supplement (2018).
D. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018, with Editorial Revision.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Indicate stud and ceiling joist layout.
   2. Describe method for securing studs to tracks and for bolted framing connections.
   3. Design data:
D. Manufacturer’s Installation Instructions: Indicate special procedures, conditions requiring special attention, and _________.
1.06 QUALITY ASSURANCE
   A. Designer Qualifications: Design framing system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
   B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, and with minimum three years of documented experience.
   C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Metal Framing:
      5. Substitutions: See Section 01 60 00 - Product Requirements.
   B. Framing Connectors and Accessories:
      1. Same manufacturer as metal framing.
      2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FRAMING SYSTEM
   A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
   B. Design Requirements: Provide completed framing system having the following characteristics:
      1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100.
      2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
      3. Design Loads: In accordance with applicable codes.
      4. Live load deflection meeting the following, unless otherwise indicated:
         a. Exterior Walls: Maximum horizontal deflection under wind load of 1/180 of span.
      5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
      6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 FRAMING MATERIALS
   A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.
      1. Gauge: 18 gauge, ____ inch.
      2. Stud Depth: 5.5 inch.
   B. Framing Connectors: Factory-made, formed steel sheet.
      1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gauge, 0.1345 inch, and factory punched holes and slots.
      2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100.
      3. Movement Connections: Provide mechanical anchorage devices that accommodate movement using slotted holes, shouldered screws or screws and anti-friction or stepped bushings, while maintaining structural performance of framing. Provide movement connections where indicated on drawings.
a. Where top of stud wall terminates below structural floor or roof, connect studs to structure in manner allowing vertical and horizontal movement of slab without affecting studs; allow for minimum movement of 1/2 inch.
b. Provide top track with long leg track and head of wall movement connectors; minimum track length of 10 feet.

2.04 FASTENERS
A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
B. Anchorage Devices: Powder actuated.

2.05 WALL SHEATHING
A. Gypsum board; complying with requirements of ASTM C1396/C1396M for gypsum sheathing, V-shaped long edges, 5/8 inch thick, Type X - Fire Resistant

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that substrate surfaces are ready to receive work.
B. Verify field measurements and adjust installation as required.

3.02 INSTALLATION OF STUDS
A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
C. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
D. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
E. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.

3.03 INSTALLATION OF WALL SHEATHING
A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
   1. Provide steel diagonal bracing at corners with foam insulation or gypsum board wall sheathing.
   2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges, and ends.

END OF SECTION
SECTION 06 10 00
ROUGH CARPENTRY

PART 1  GENERAL

1.01 SECTION INCLUDES
A. Rough opening framing for doors, windows, and roof openings.
B. Preservative treated wood materials.
C. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS
A. Section 07 25 00 - Weather Barriers: Air barrier over sheathing.
B. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
C. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

1.03 REFERENCE STANDARDS

1.04 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, and installation.

PART 2  PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   2. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
A. Sizes: Nominal sizes as indicated on drawings, S4S.
B. Moisture Content: S-dry or MC19.
C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

2.03 ACCESSORIES
A. Fasteners and Anchors:

2.04 FACTORY WOOD TREATMENT
A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber exposed to weather.
      c. Treat lumber in contact with masonry or concrete.
      d. Treat lumber less than 18 inches above grade.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL
   A. Select material sizes to minimize waste.
   B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
   C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS
   A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
   B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
   C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
   D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
   E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 TOLERANCES
   A. Framing Members: 1/4 inch from true position, maximum.
   B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.04 FIELD QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for additional requirements.

3.05 CLEANING
      1. Comply with applicable regulations.
      2. Do not burn scrap on project site.
      3. Do not burn scraps that have been pressure treated.
      4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or "waste-to-energy" facilities.
   B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.
C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION
PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Board insulation at perimeter foundation wall.
   B. Batt insulation and vapor retarder in exterior wall, ceiling, and roof construction.
   C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.

1.02 RELATED REQUIREMENTS
   A. Section 06 10 00 - Rough Carpentry: Installation requirements for board insulation over steep slope roof sheathing or roof structure.
   B. Section 07 25 00 - Weather Barriers: Separate air barrier and vapor retarder materials.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
D. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

1.05 QUALITY ASSURANCE
A. Air Barrier Association of America (ABAA) Evaluated Materials Program (EAP); www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.06 FIELD CONDITIONS
A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 APPLICATIONS
A. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
B. Insulation in Metal Framed Walls: Batt insulation with no vapor retarder.

2.02 FOAM BOARD INSULATION MATERIALS
A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
   1. Type and Compressive Resistance: Type VI, 40 psi (276 kPa), minimum.
   2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
   6. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.

2.03 BATT INSULATION MATERIALS
A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
   1. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
   2. Formaldehyde Content: Zero.
C. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER
A. Adhere a 6 inches wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
1. Tape seal joints.
2. Extend sheet full height of joint.
B. Apply adhesive to back of boards:
1. Three continuous beads per board length.
2. Full bed 1/8 inch thick.
C. Install boards horizontally on foundation perimeter.
1. Place boards to maximize adhesive contact.
2. Install in running bond pattern.
3. Butt edges and ends tightly to adjacent boards and to protrusions.
D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
E. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.

3.03 BATT INSTALLATION
A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
B. Install in exterior wall and roof spaces without gaps or voids. Do not compress insulation.
C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
E. Coordinate work of this section with requirements for vapor retarder, see Section 07 25 00.
F. Coordinate work of this section with construction of air barrier seal, see Section 07 25 00.

3.04 PROTECTION
A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
B. Section 06 10 00 - Rough Carpentry: Water-resistive barrier under exterior cladding.
C. Section 07 21 00 - Thermal Insulation: Vapor retarder installed in conjunction with batt insulation.
D. Section 07 92 00 - Joint Sealants: Sealing building expansion joints.
E. Section 09 21 16 - Gypsum Board Assemblies: Water-resistive barrier under exterior cladding.

1.03 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistant barriers, air barriers, or vapor retarders.
B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
1. Water Vapor Permeance: For purposes of conversion, 57.2 ng/(Pa s sq m) = 1 perm.
D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

1.04 REFERENCE STANDARDS


1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on material characteristics.
C. Manufacturer's Installation Instructions: Indicate preparation, installation methods, and storage and handling criteria.
D. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
E. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

1.06 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Evaluated Materials Program (EAP); www.airbarrier.org/#sle: Use evaluated materials from a single manufacturer regularly engaged
in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

B. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

1.07 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. Air Barrier:
   1. On outside surface of sheathing of exterior walls use air barrier sheet, mechanically fastened type.

2.02 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)

A. Air Barrier Sheet, Mechanically Fastened:
   1. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (Desiccant Method) at 73.4 degrees F.
   3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 180 days of weather exposure.
   4. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
   5. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches wide, compatible with sheet material; unless otherwise specified.

B. Air Barrier Sheet, Self-Adhered:
   1. Air Permeance: 0.004 cfm/sq ft, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 10 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (Desiccant Method) at 73.4 degrees F.
   3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 90 days of weather exposure.
   4. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less (Class A), when tested in accordance with ASTM E84.
   6. Seam and Perimeter Tape: As recommended by sheet manufacturer.

2.03 ACCESSORIES

A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION

A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.03 INSTALLATION

A. Install materials in accordance with manufacturer's instructions.

B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.

C. Mechanically Fastened Sheets - On Exterior:
   1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
2. Overlap seams as recommended by manufacturer but at least 6 inches.
3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
5. Install air barrier and vapor retarder underneath the jamb flashings.
6. Install head flashings under weather barrier.
7. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

D. Self-Adhered Sheets:
1. Prepare substrate in manner recommended by sheet manufacturer; fill and tape joints in substrate and between dissimilar materials.
2. Lap sheets shingle-fashion to shed water and seal laps air tight.
3. Once sheets are in place, press firmly into substrate with resilient hand roller; ensure that laps are firmly adhered with no gaps or fishmouths.
4. Use same material, or other material approved by sheet manufacturer for the purpose, to seal to adjacent construction and as flashing.
5. At wide joints, provide extra flexible membrane allowing joint movement.

E. Openings and Penetrations in Exterior Weather Barriers:
1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements for additional requirements.
B. Coordination of ABAA Tests and Inspections:
1. Provide testing and inspection required by ABAA QAP.
2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
3. Cooperate with ABAA testing agency.
4. Allow access to air barrier work areas and staging.
5. Do not cover air barrier work until tested, inspected, and accepted.

3.05 PROTECTION
A. Do not leave materials exposed to weather longer than recommended by manufacturer.
B. Do not leave paper- or felt-based barriers exposed to weather for longer than one week.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Nonsag gunnable joint sealants.
B. Self-leveling pourable joint sealants.
C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS
A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.
B. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.
C. Section 07 91 00 - Preformed Joint Seals: Precompressed foam, gaskets, and strip seals.
D. Section 08 71 00 - Door Hardware: Setting exterior door thresholds in sealant.
E. Section 08 80 00 - Glazing: Glazing sealants and accessories.
F. Section 09 21 16 - Gypsum Board Assemblies: Sealing acoustical and sound-rated walls and ceilings.
G. Section 09 22 16 - Non-Structural Metal Framing: Sealing between framing and adjacent construction in acoustical and sound-rated walls and ceilings.

1.03 REFERENCE STANDARDS
1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
   1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
   2. List of backing materials approved for use with the specific product.
   3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
   4. Substrates the product should not be used on.
   5. Installation instructions, including precautions, limitations, and recommended backing materials and tools.

C. Product Data for Accessory Products: Submit manufacturer's technical data sheet for each product to be used, including physical characteristics, installation instructions, and recommended tools.

D. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.

E. Samples for Verification: Where custom sealant color is specified, obtain directions from Architect and submit at least two physical samples for verification of color of each required sealant.

F. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.

G. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.

H. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
   3. Allow sufficient time for testing to avoid delaying the work.
   4. Deliver to manufacturer sufficient samples for testing.
   5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
   6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.

C. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
   1. Identification of testing agency.
   2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
      a. Test date.
      b. Copy of test method documents.
      c. Age of sealant upon date of testing.
      d. Test results, modeled after the sample form in the test method document.
      e. Indicate use of photographic record of test.

D. Field Adhesion Test Procedures:
   1. Allow sealants to fully cure as recommended by manufacturer before testing.
2. Have a copy of the test method document available during tests.
3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.

E. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inches long.
2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

1.06 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Correct defective work within a five year period after Date of Substantial Completion.
C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS
2.01 JOINT SEALANT APPLICATIONS
A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. Other joints indicated below.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
   a. Joints between door, window, and other frames and adjacent construction.
   b. Other joints indicated below.
3. Do not seal the following types of joints.
   a. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
   b. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
   c. Joints where installation of sealant is specified in another section.
   d. Joints between suspended panel ceilings/grid and walls.
B. Type ___ - Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
C. Type ___ - Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.

2.02 JOINT SEALANTS - GENERAL
A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 61 16.
B. Colors: As indicated on drawings.
2.03 NONSAG JOINT SEALANTS

A. Type A - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 35 percent, minimum.
   2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

B. Type B - Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
   3. Color: Match adjacent finished surfaces.
   4. Service Temperature Range: Minus 40 to 180 degrees F.

2.04 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
   1. Type for Joints Not Subject to Pedestrian or Vehicular Traffic: ASTM C1330; Type O - Open Cell Polyurethane.
   2. Open Cell: 40 to 50 percent larger in diameter than joint width.

B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

C. Masking Tape: Self-adhesive, non-absorbtent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.
B. Verify that backing materials are compatible with sealants.
C. Verify that backer rods are of the correct size.
D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
   1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
   2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
   3. Record each test on Preinstallation Adhesion Test Log as indicated.
   4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
   5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.
B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.
3.03 INSTALLATION
   A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
   B. Perform installation in accordance with ASTM C1193.
   C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
   D. Install bond breaker backing tape where backer rod cannot be used.
   E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
   F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
   G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

3.04 FIELD QUALITY CONTROL
   A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
   B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

3.05 POST-OCCUPANCY
   A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

END OF SECTION
SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Aluminum-framed storefront, with vision glass.
B. Aluminum doors and frames.
C. Weatherstripping.

1.02  RELATED REQUIREMENTS
A. Section 07 25 00 - Weather Barriers: Sealing framing to weather barrier installed on adjacent construction.
B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
C. Section 08 44 13 - Glazed Aluminum Curtain Walls.
D. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
E. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.03  REFERENCE STANDARDS
A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
H. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, and internal drainage details.
C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
D. Samples: Submit two samples ___ by ____ inches in size illustrating finished aluminum surface, glass, infill panels, glazing materials.
E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

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

1.08 FIELD CONDITIONS
A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.
1.09 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS
2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING
A. Front-Set Style, Thermally-Broken:

2.02 BASIS OF DESIGN -- SWINGING DOORS
A. Wind-Borne-Debris Resistance Tested:
B. Medium Stile, Insulating Glazing, Not Thermally-Broken:
C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
   2. Trulite Glass & Aluminum Solutions, LLC; _____: www.trulite.com/#sle.
D. Substitutions: See Section 01 60 00 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

2.03 ALUMINUM-FRAMED STOREFRONT
A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: Class I color anodized.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
   2. Finish Color: Dark bronze.
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
9. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.

B. Performance Requirements
1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
   a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection, having Florida Building Code "FLA (PAD)" approval for Large and Small Missile impact and pressure cycling at design wind pressure.
3. Air Leakage: 0.06 cfm/sq ft maximum leakage of storefront wall area when tested in accordance with ASTM E283/E283M at 1.57 psf pressure difference.

2.04 COMPONENTS
A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
   1. Framing members for interior applications need not be thermally broken.
   2. Glazing Stops: Flush.
   3. Cross-Section: As indicated on drawings.
B. Glazing: As specified in Section 08 80 00.
C. Swing Doors: Glazed aluminum.
   2. Top Rail: 3-1/2 inches wide.
   3. Vertical Stiles: 3-1/2 inches wide.
   5. Glazing Stops: Square.
   6. Finish: Same as storefront.

2.05 MATERIALS
B. Fasteners: Stainless steel.
C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.06 FINISHES
A. Class I Color Anodized Finish: AAMA 611 AA-M12C22A42 Integrally colored anodic coating not less than 0.7 mils thick.
B. Color: As indicated on drawings.
C. Touch-Up Materials: As recommended by coating manufacturer for field application.

2.07 HARDWARE
A. For each door, include weatherstripping, sill sweep strip, and threshold.
B. Other Door Hardware: As specified in Section 08 71 00.
C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
D. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.
E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify dimensions, tolerances, and method of attachment with other work.
B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION
A. Install wall system in accordance with manufacturer’s instructions.
B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
C. Provide alignment attachments and shims to permanently fasten system to building structure.
D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
E. Provide thermal isolation where components penetrate or disrupt building insulation.
F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
I. Set thresholds in bed of sealant and secure.
J. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
K. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

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

3.04 FIELD QUALITY CONTROL
A. Provide services of storefront manufacturer's field representative to observe for proper installation of system and submit report.
B. See Section 01 40 00 - Quality Requirements, for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.
C. Provide field testing of installed storefront system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
1. Perform a minimum of two tests in each designated area as indicated on drawings.
2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf.
   a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
4. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.
   a. Maximum allowable rate of air leakage is 0.09 cfm/sq ft.
D. Repair or replace storefront components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 ADJUSTING
A. Adjust operating hardware and sash for smooth operation.

3.06 CLEANING
A. Remove protective material from pre-finished aluminum surfaces.
B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, and take care to remove dirt from corners and to wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.07 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION
SECTI0N 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Aluminum-framed curtain wall, with vision glazing and glass, metal, and stone infill panels.

1.02 RELATED REQUIREMENTS
   A. Section 03 30 00 - Cast-in-Place Concrete: Weld plates embedded in concrete for attachment of anchors.
   B. Section 07 25 00 - Weather Barriers: Sealing framing to weather barrier installed on adjacent construction.
   C. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
   D. Section 08 80 00 - Glazing.
   E. Section 09 21 16 - Gypsum Board Assemblies: Metal stud and gypsum board wall at interior of curtain wall.

1.03 REFERENCE STANDARDS
   A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
   D. AAMA 501.4 - Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts; 2018.
   F. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
   K. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
AA. ASTM E413 - Classification for Rating Sound Insulation; 2016.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordinate with installation of other components that comprise the exterior enclosure.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, _____, and infill.
C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
D. Samples: Submit two samples 3 by 3 inches in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.
E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.
H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner’s name and registered with manufacturer.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.
   1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
B. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.
   1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.

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

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

1.09 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS
2.01 BASIS OF DESIGN - CURTAIN WALL SYSTEMS
A. Wind-Borne-Debris Resistance Tested:
B. Other Manufacturers: Provide either product identified as “Basis of Design” or an equivalent product of one of the manufacturers listed below.
   2. Trulite Glass & Aluminum Solutions, LLC; _____: www.trulite.com/#sle.
C. Substitutions: See Section 01 60 00 - Product Requirements.
   1. For any product not identified as “Basis of Design”, submit information as specified for substitutions.

2.02 CURTAIN WALL
A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Fabrication Method: Field fabricated stick system.
   2. Glazing Method: Field glazed system.
   3. Finish: Class I natural anodized.
      a. Factory finish surfaces that will be exposed in completed assemblies.
      b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
4. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.

B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
1. Design Wind Loads: Comply with the requirements of ASCE 7.
2. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection tested by independent agency in accordance with ASTM E1996 for Wind Zone 2 - Enhanced Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
3. Movement: Accommodate the following movement without damage to components or deterioration of seals:
   a. Expansion and contraction caused by 180 degrees F surface temperature.
   b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
   c. Movement of curtain wall relative to perimeter framing.
   d. Deflection of structural support framing, under permanent and dynamic loads.

C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
1. Test Pressure Differential: 15 psf.

D. Air Leakage: 0.06 cfm/sq ft maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.27 psf pressure difference across assembly.

E. Thermal Performance Requirements:
1. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
2. Overall U-value Including Glazing: U-0.37 Btu/(hr sq ft deg F), maximum.

2.03 COMPONENTS
A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
B. Glazing: As specified in Section 08 80 00.

2.04 MATERIALS
B. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
C. Weatherseal Sealant: Silicone, with adhesion in compliance with ASTM C794; compatible with glazing accessories.
D. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, and compatible with flashing material.
E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
F. Glazing Accessories: As specified in Section 08 80 00.

2.05 FINISHES
A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.
B. Color: As indicated on drawings.
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify dimensions, tolerances, and method of attachment with other related work.
   B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
   C. Verify that anchorage devices have been properly installed and located.

3.02 INSTALLATION
   A. Install curtain wall system in accordance with manufacturer's instructions.
   B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
   C. Provide alignment attachments and shims to permanently fasten system to building structure.
   D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
   E. Provide thermal isolation where components penetrate or disrupt building insulation.
   F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
   G. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES
   A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
   B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.
   C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.04 FIELD QUALITY CONTROL
   A. Provide services of curtain wall manufacturer's field representative to observe for proper installation of system and submit report.
   B. See Section 01 40 00 - Quality Requirements, for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.
   C. Provide field testing of installed curtain wall system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
      1. Perform a minimum of two tests in each designated area as indicated on drawings.
      2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
      3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf.
         a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.
      4. Field test for air leakage in accordance with ASTM E783 with uniform static air pressure difference of 1.57 psf.
         a. Maximum allowable rate of air leakage is 0.09 cfm/sq ft.
   D. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

3.05 CLEANING
   A. Remove protective material from pre-finished aluminum surfaces.
   B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.
C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

3.06 PROTECTION
   A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION
SECTION 08 71 00
DOOR HARDWARE

PART 2 PRODUCTS

1.01 DESIGN AND PERFORMANCE CRITERIA

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
   2. Fire-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
   3. Hardware on Fire-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), testing firm acceptable to authorities having jurisdiction, or _____ as suitable for application indicated.

1.02 FINISHES

END OF SECTION
SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Insulating glass units.
B. Glazing units.
C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS
A. Section 07 25 00 - Weather Barriers.
B. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.
C. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.
D. Section 08 44 13 - Glazed Aluminum Curtain Walls: Glazing furnished as part of wall assembly.
E. Section 08 87 23 - Safety and Security Films.

1.03 REFERENCE STANDARDS
O. ASTM E413 - Classification for Rating Sound Insulation; 2016.
V. GANA (SM) - GANA Sealant Manual; 2008.
X. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
AD. UFC 4-010-01 - DoD Minimum Antiterrorism Standards for Buildings; 2018.
AE. UL (DIR) - Online Certifications Directory; Current Edition.
AF. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by each of the affected installers.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data on Insulating Glass Unit and Glazing Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
D. Certificate: Certify that products of this section meet or exceed specified requirements.
E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE
A. Perform Work in accordance with GANA (GM), GANA (SM), GANA (LGRM), IGMA TM-3000, and _______ for glazing installation methods.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
   1. Provide certified glass products through ANSI accredited certifications that include plant audits and independent laboratory performance testing.
C. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.
   1. Provide company, field supervisors, and installers that hold active ANSI accredited certifications in appropriate categories for work specified.
D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.
1.07 FIELD CONDITIONS
A. Do not install glazing when ambient temperature is less than 40 degrees F.
B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.
C. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

PART 2 PRODUCTS
2.01 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES
A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Design Pressure: Calculated in accordance with ASCE 7.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Seismic Loads: Design and size glazing components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
   4. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   5. Glass thicknesses listed are minimum.
B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.
      a. Refer to Section 07 25 00.
C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.

2.02 GLASS MATERIALS
A. Float Glass: Provide float glass based glazing unless otherwise indicated.
   1. Kind FT - Fully Tempered Type: Complies with ASTM C1048.
   2. Fully Tempered Safety Glass: Complies with ANSI Z97.1 or 16 CFR 1201 criteria for safety glazing used in hazardous locations.
B. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
   1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category II impact test requirements.

2.03 INSULATING GLASS UNITS
A. Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
4. Edge Seal:
   a. Dual-Sealed System: Provide polysisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
   b. Color: Black.
5. Purge interpane space with dry air, hermetically sealed.

B. Type IG-1 - Insulating Glass Units: Vision glass, double glazed.
1. Applications: Exterior glazing unless otherwise indicated.
2. Space between lites filled with argon.
3. Outboard Lite: Fully tempered float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
   b. Coating: Low-E (passive type), on #2 surface.
4. Inboard Lite: Laminated float glass, 1/4 inch thick, minimum.
   a. Tint: Clear.
5. Total Thickness: 1-5/16 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
8. Shading Coefficient: 0.44, nominal.

C. Type IG-5 - Insulating Glass Units: Safety glazing.
1. Applications:
   a. Glazed lites in exterior doors.
   b. Glazed sidelights and panels next to doors.
   c. Other locations required by applicable federal, state, and local codes and regulations.
2. Space between lites filled with argon.
3. Glass Type: Same as Type IG-1 except use fully tempered float glass for both outboard and inboard lites.
4. Tint: Clear.
5. Total Thickness: 1-5/16 inch.
6. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.24, nominal.
8. Shading Coefficient: 0.44, nominal.

2.04 GLAZING UNITS
A. Type G-8 - Hurricane Impact Resistance Glazing: Laminated glass, 3-Ply.
1. Applications: Locations as indicated on drawings.
2. Tint: Clear.
3. Thickness: As required to meet performance criteria.
4. Outside Lite: Tempered glass.
5. Interlayer: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
6. Middle Lite: Annealed glass.
7. Interlayer, Inboard Side: Polyvinyl butyral (PVB), thickness as required to meet performance criteria.
8. Inside Lite: Tempered glass.
9. Performance Criteria:

11. Shading Coefficient: 0.44, nominal.

2.05 GLAZING COMPOUNDS
A. Type GC-5 - Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; _____ color.

2.06 ACCESSORIES
A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

2.07 SOURCE QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Provide shop inspection and testing for Type _____ glass.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS
A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.02 PREPARATION
A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.03 INSTALLATION, GENERAL
A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.
B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer’s instructions.
C. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.04 INSTALLATION - WET GLAZING METHOD (SEALANT AND SEALANT)
A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
B. Place setting blocks at 1/4 points and install glazing pane or unit.
C. Install removable stops with glazing centered in space by inserting spacer shims both sides at 24 inch intervals, 1/4 inch below sight line.
D. Fill gaps between glazing and stops with ________ type sealant to depth of bite on glazing, but not more than 3/8 inch below sight line to ensure full contact with glazing and continue the air and vapor seal.

E. Apply sealant to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.05 INSTALLATION - PLASTIC FILM
A. Install plastic film with adhesive, applied in accordance with film manufacturer's instructions.
B. Place without air bubbles, creases or visible distortion.
C. Install film tight to perimeter of glass and carefully trim film with razor sharp knife. Provide 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required. Do not score the glass.

3.06 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
C. Monitor and report installation procedures and unacceptable conditions.

3.07 CLEANING
A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
B. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
C. Remove non-permanent labels immediately after glazing installation is complete.
D. Clean glass and adjacent surfaces after sealants are fully cured.
E. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer’s written recommendations.

3.08 PROTECTION
A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

END OF SECTION
SECTION 08 87 23
SAFETY AND SECURITY FILMS

PART 1  GENERAL

1.01  SECTION INCLUDES
A.  Glazing film applied to new glazing assemblies.
B.  New Glazing: Factory or shop install film to glazing before installation in frames.
C.  Glazing assemblies to receive film are indicated on drawings.

1.02  RELATED REQUIREMENTS
A.  Section 08 44 13 - Glazed Aluminum Curtain Walls: New glazing to receive film.
B.  Section 08 80 00 - Glazing: New glazing to receive film.

1.03  ABBREVIATIONS AND ACRONYMS
B.  GSA - General Services Administration.

1.04  REFERENCE STANDARDS
F.  GSA TS01 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings; General Services Administration; 2003.

1.05  SUBMITTALS
A.  See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B.  Product Data: Manufacturer's data sheets on each product to be used, including:
   1.  Record of product certification for safety requirements.
   2.  Preparation instructions and recommendations.
   3.  Storage and handling requirements and recommendations.
   4.  Installation methods.
C.  Samples: For each film product to be used, minimum size 4 inches by 6 inches, representing actual product, color, and patterns.
D.  Test Reports: Detailed reports of full-scale chamber tests to specified criteria, using assemblies identical to those required for this project.
E.  Specimen Warranty.

1.06  QUALITY ASSURANCE
A.  Manufacturer Qualifications: Glazing film manufacturer specializing in manufacture of safety glazing films with minimum 10 years successful experience.

1.07  DELIVERY, STORAGE, AND HANDLING
A.  Store products in manufacturer's unopened packaging until ready for installation.
B.  Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.
1.08 FIELD CONDITIONS
   A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY
   A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
   B. Provide 10 year manufacturer's replacement warranty to cover film against peeling, cracking, discoloration, and deterioration.

PART 2 PRODUCTS

2.01 SAFETY AND SECURITY GLAZING FILM
   A. Safety Glazing: Retrofit existing glazing assemblies to provide impact resistance complying with ANSI Z97.1 and 16 CFR 1201, Category II.
      1. Surface applied film.
   B. Blast Resistant Glazing at Ground Level: Retrofit existing glazing assemblies to provide Level 2 blast resistance when tested in accordance with GSA TS01 at a peak pressure of ___ psi, and a positive phase impulse of ____; and impact resistance complying with ANSI Z97.1 and 16 CFR 1201, Category II, as specified.
      1. Surface applied film.

2.02 MATERIALS
   A. Glazing Film: Transparent polyester film for permanent bonding to glass.
      1. Thickness: 0.008 inch, minimum.
      2. Color: Clear.
      4. Adhesive Type: Pressure sensitive acrylic.
   B. Accessory Materials: As recommended or required by film manufacturer.
   C. Glass Cleaner: As recommended by glazing film manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Field Applied Film: Verify that existing conditions are adequate for proper application and performance of film.
   B. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.
   C. Verify glass is not cracked, chipped, broken, or damaged.
   D. Verify that frames are securely anchored and free of defects.
   E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION
   A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
   B. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
   C. Protect adjacent surfaces.
   D. Do not begin installation until substrates have been properly prepared.

3.03 INSTALLATION
   A. Do not apply glazing film when surface temperature is less that 40 degrees F or if precipitation is imminent.
B. Install in accordance with manufacturer's instructions, without air bubbles, wrinkles, streaks, bands, thin spots, pinholes, or gaps, as required to achieve specified performance.

C. Accurately cut film with straight edges to required sizes allowing 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required by anchorage method.

D. Seams: Seam film only as required to accommodate material sizes; form seams vertically without overlaps and gaps; do not install with horizontal seams.

E. Clean glass and anchoring accessories following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.

F. Remove labels and protective covers.

### 3.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**
SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Gypsum sheathing.
B. Gypsum wallboard.
C. Joint treatment and accessories.
D. Water-resistive barrier over exterior wall sheathing.

1.02 RELATED REQUIREMENTS
A. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
B. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
C. Section 09 22 16 - Non-Structural Metal Framing.

1.03 REFERENCE STANDARDS
D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2018.

PART 2 PRODUCTS

2.01 BOARD MATERIALS
A. Manufacturers - Gypsum-Based Board:
   3. USG Corporation; ____: www.usg.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Thickness:
C. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
   1. Application: Exterior sheathing, unless otherwise indicated.
   2. Glass Mat Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
3. Core Type: Type X, as indicated.
4. Type X Thickness: 5/8 inch.
5. Edges: Square.
6. Glass Mat Faced Products:
   c. USG Corporation; USG Securock Brand Ultralight Glass-Mat Sheathing: www.usg.com/#sle.
   d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Exterior Soffit Board: Exterior gypsum soffit board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Ceilings and soffits in protected exterior areas, unless otherwise indicated.
   2. Types: Type X and Type C, in locations indicated.
   3. Type X Thickness: 5/8 inch.
   4. Type C Thickness: 5/8 inch.
   5. Edges: Tapered.

2.02 GYPSUM WALLBOARD ACCESSORIES
A. Water-Resistive Barrier: As specified in Section 07 25 00.
B. Finishing Accessories: ASTM C1047, extruded aluminum alloy (6063 T5) or galvanized steel sheet ASTM A924/A924M G90, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
   3. Products:
      a. Same manufacturer as framing materials.
      b. Substitutions: See Section 01 60 00 - Product Requirements.
C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Fiberglass Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
   2. Paper Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
   4. Joint Compound: Setting type, field-mixed.
D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.
E. Exterior Soffit Vents: One piece, perforated, ASTM B221 6063 T5 alloy aluminum, with edge suitable for direct application to gypsum board and manufactured especially for soffit application. Provide continuous vent.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that project conditions are appropriate for work of this section to commence.

3.02 BOARD INSTALLATION
A. Comply with ASTM C840, GA-216, and manufacturer’s instructions. Install to minimize butt end joints, especially in highly visible locations.
B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
C. Fire-Resistance-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

D. Exterior Sheathing: Comply with ASTM C1280. Install sheathing vertically, with edges butted tight and ends occurring over firm bearing.
   1. Seal joints, cut edges, and holes with water-resistant sealant.
   2. Paper-Faced Sheathing: Immediately after installation, protect from weather by application of water-resistant barrier.

E. Exterior Soffits: Install exterior soffit board perpendicular to framing, with staggered end joints over framing members or other solid backing.
   1. Seal joints, cut edges, and holes with water-resistant sealant.

F. Installation on Metal Framing: Use screws for attachment of gypsum board except face layer of nonrated double-layer assemblies, which may be installed by means of adhesive lamination.

3.03 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

D. Exterior Soffit Vents: Install according to manufacturer's written instructions and in locations indicated on drawings. Provide vent area specified.

3.04 JOINT TREATMENT

A. Glass Mat Faced Gypsum Board and Exterior Glass Mat Faced Sheathing: Use fiberglass joint tape, embed and finish with setting type joint compound.

B. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.

C. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding are not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling, and sanding are not required at base layer of double-layer applications.

3.05 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION
SECTION 09 22 16
NON-STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Metal partition, ceiling, and soffit framing.
B. Framing accessories.

1.02 RELATED REQUIREMENTS
A. Section 06 10 00 - Rough Carpentry: Wood blocking within stud framing.
B. Section 07 25 00 - Weather Barriers.
C. Section 07 92 00 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
D. Section 09 21 16 - Gypsum Board Assemblies: Metal studs for gypsum board partition framing.
E. Section 09 22 36 - Lath.

1.03 REFERENCE STANDARDS
D. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2018.

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Shop Drawings:
   1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
   2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Metal Framing, Connectors, and Accessories:
   1. CEMCO; _____: www.cemcosteel.com/#sle.
   2. ClarkDietrich; ________: www.clarkdietrich.com/#sle.
2.02 FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf.
   1. Studs: C shaped with knurled or embossed faces.
   2. Runners: U shaped, sized to match studs.

B. Partition Head to Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and braced with continuous bridging on both sides.

C. Non-Loadbearing Framing Accessories:
   1. Framing Connectors: ASTM A653/A653M G90 galvanized steel clips; secures cold rolled channel to wall studs for lateral bracing.

2.03 FABRICATION

A. Fabricate assemblies of framed sections to sizes and profiles required.

B. Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

3.02 CEILING AND SOFFIT FRAMING

A. Install furring after work above ceiling or soffit is complete. Coordinate the location of hangers with other work.

B. Install furring independent of walls, columns, and above-ceiling work.

C. Securely anchor hangers to structural members or embed them in structural slab. Space hangers as required to limit deflection to criteria indicated. Use rigid hangers at exterior soffits.

D. Space main carrying channels at maximum 72 inch on center, and not more than 6 inches from wall surfaces. Lap splice securely.

E. Securely fix carrying channels to hangers to prevent turning or twisting and to transmit full load to hangers.

F. Place furring channels perpendicular to carrying channels, not more than 2 inches from perimeter walls, and rigidly secure. Lap splices securely.

END OF SECTION
SECTION 09 22 36
LATH

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Metal lath for cement and gypsum plaster.

1.02  RELATED REQUIREMENTS
A. Section 07 25 00 - Weather Barriers: Weather barrier under exterior plaster and stucco.
B. Section 09 21 16 - Gypsum Board Assemblies: Sheathing on exterior walls.
C. Section 09 22 16 - Non-Structural Metal Framing.
D. Section 09 24 00 - Cement Plastering.

1.03  REFERENCE STANDARDS
E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2018.
F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2018.

1.04  SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on furring and lathing components, structural characteristics, material limitations, and finish.

1.05  QUALITY ASSURANCE
A. Maintain one copy of each installation standard referenced on site throughout the duration of lathing and plastering work.
B. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

PART 2  PRODUCTS

2.01  LATH
   1. Weight: To suit application and as specified in ASTM C841 or ASTM C1063 for framing spacing.
   2. Backed with foil.
B. Flat Rib Metal Lath: ASTM C847, galvanized; 1/8 inch thick.
1. Weight: To suit application and as specified in ASTM C841 or ASTM C1063 for framing spacing.
2. Backed with foil.

   1. Weight: To suit application and as specified in ASTM C841 or ASTM C1063 for framing spacing.
   2. Backed with foil.

D. Corner Mesh: ASTM C1063; Formed sheet steel, minimum 0.018 inch thick, perforated flanges shaped to permit complete embedding in plaster, minimum 2 inch size; same finish as lath.

E. Strip Mesh: Expanded metal lath, same weight as lath, 2 inch wide by 24 inch long; same finish as lath.

F. Finishing Accessories: ASTM C841 (gypsum plaster) or ASTM C1063 (cement plaster); extruded aluminum alloy (6063 T5), galvanized steel sheet ASTM A924/A924M G90, or galvanized steel wire, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed plaster edges.
   3. Products:
      a. Same manufacturer as framing materials.
      b. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES
   A. Fasteners: Self-piercing tapping screws; ASTM C1002 or ASTM C954.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify that substrates are ready to receive work and conditions are suitable for application.
   C. For exterior plaster and stucco on stud walls, verify that water-resistive barrier has been installed over sheathing substrate completely and correctly.
   D. Do not begin until unacceptable conditions have been corrected.
   E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 INSTALLATION - GENERAL
   A. Install interior lath and furring for gypsum plaster in accordance with ASTM C841.
   B. Install metal lath and furring for Portland cement plaster in accordance with ASTM C1063.

3.03 LATH INSTALLATION
   A. Apply lath taut, with long dimension perpendicular to supports.
   B. Lap or nest ends of metal lath in accordance with ASTM C841.
   C. Continuously reinforce internal angles with corner mesh, except where the metal lath returns 3 inches from corner to form the angle reinforcement; fasten at perimeter edges only.
   D. Place corner bead at external wall corners; fasten at outer edges of lath only.
   E. Place base screeds at termination of plaster areas; secure rigidly in place.
   F. Place lath vertically above each top corner and each side of door frames to 6 inches above ceiling line.
   G. Place casing beads at terminations of plaster finish. Butt and align ends. Secure rigidly in place.
   H. Place additional strip mesh diagonally at corners of lathed openings. Secure rigidly in place.
3.04 TOLERANCES

A. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet.
B. Maximum Variation from True Position: 1/8 inch.

END OF SECTION
PART 1  GENERAL

1.01  SECTION INCLUDES
A. Cement plastering.

1.02  RELATED REQUIREMENTS
A. Section 05 40 00 - Cold-Formed Metal Framing: Structural metal framing for plaster.
B. Section 06 10 00 - Rough Carpentry: Wood stud framing for plaster.
C. Section 07 25 00 - Weather Barriers.
D. Section 09 21 16 - Gypsum Board Assemblies: Metal stud framing and furring for plaster.
E. Section 09 22 36 - Lath: Lath, furring, beads, screeds, and joint accessories for plaster base.

1.03  REFERENCE STANDARDS
M. FM (AG) - FM Approval Guide; current edition.
N. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
O. ITS (DIR) - Directory of Listed Products; current edition.
P. UL (DIR) - Online Certifications Directory; Current Edition.

1.04  SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
B. Product Data: Provide data on plaster materials and trim accessories.

1.05  QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
1.06 FIELD CONDITIONS
   A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.

PART 2 PRODUCTS
2.01 CEMENT PLASTER APPLICATIONS
   A. Lath Plaster Base: Metal lath.
      1. Plaster Type: Factory prepared plaster mix.
      2. Number of Coats: Three.
      3. First Coat: Apply to a nominal thickness of 3/8 inch.
      5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
      6. Finish Coat: Apply to a nominal thickness of 1/8 inch.

2.02 FACTORY PREPARED CEMENT PLASTER
   A. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.

2.03 ACCESSORIES
   A. Lath: See Section 09 22 36.
   B. Finishing Accessories: See Section 09 22 36.
   C. Bonding Compound: Provide type recommended for bonding plaster to solid surfaces, complying with ASTM C932.
   D. Water Resistive Barrier: See Section 07 25 00.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions are acceptable prior to starting this work.
   B. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly in place.

3.02 PREPARATION
   A. Roughen smooth concrete surfaces and apply bonding compound in accordance with manufacturer's written installation instructions.

3.03 MIXING
   A. Mix only as much plaster as can be used prior to initial set.
   B. Mix materials dry, to uniform color and consistency, before adding water.
   C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.04 APPLICATION
   A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
   B. Base Coats:
      1. Apply base coat(s) to fully embed lath and to specified thickness.
      2. Follow guidelines in ASTM C926 and manufacturer's written installation instructions for moist curing base coats and application of subsequent coats.
   C. Leveling Coat:
      1. Apply leveling coat to specified thickness.
      2. Fully embed reinforcing mesh in leveling coat.
   D. Finish Coats:
      1. Cement Plaster:
a. Apply with sufficient material and pressure to ensure complete coverage of base to specified thickness.
b. Apply desired surface texture while mix is still workable.

3.05 TOLERANCES
A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.06 REPAIR
A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same composition; finish to match surrounding area.

END OF SECTION
SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Suspended metal grid ceiling system.
   B. Acoustical units.

1.02  RELATED REQUIREMENTS
   A. Section 21 13 00 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.
   B. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling.
   C. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.
   D. Section 28 46 00 - Fire Detection and Alarm: Fire alarm components in ceiling system.

1.03  REFERENCE STANDARDS
   O. CHPS (HPPD) - High Performance Products Database; Current Edition at www.chps.net/.
   P. ITS (DIR) - Directory of Listed Products; current edition.
   S. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.
1.04 ADMINISTRATIVE REQUIREMENTS
   A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
   B. Do not install acoustical units until after interior wet work is dry.

1.05 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on suspension system components and acoustical units.
   C. Samples: Submit two samples 3 by 3 inch in size illustrating material and finish of acoustical units.
   D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
      1. See Section 01 60 00 - Product Requirements, for additional provisions.
      2. Extra Acoustical Units: Quantity equal to 10 percent of total installed.

1.06 QUALITY ASSURANCE
   A. Designer Qualifications for Seismic Design: Perform under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
   B. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
   C. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

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

PART 2 PRODUCTS
2.01 MANUFACTURERS
   A. Acoustic Tiles/Panels:
      2. Hunter Douglas Architectural; Techstyle Series:
         www.hunterdouglasarchitectural.com/#sle.
      4. Substitutions: See Section 01 60 00 - Product Requirements.
   B. Suspension Systems:
      1. Same as for acoustical units.

2.02 ACOUSTICAL UNITS
   A. Acoustical Units - General: ASTM E1264, Class A.
   B. Acoustical Tiles: Painted mineral fiber, with the following characteristics:
      1. Classification: ASTM E1264 Type III.
         a. Pattern: "E" - lightly textured.
      2. Size: 24 by 24 inches.
      4. STC Rating: minimum
      5. Tile Edge: Beveled.
         a. Joint: Kerfed and rabbeted.
2.03 SUSPENSION SYSTEM(S)

A. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
   1. Materials:

B. Exposed Suspension System, Type _____: Aluminum grid and cap; factory-applied closed-cell foam gaskets.
   1. Structural Classification: Intermediate-duty, when tested in accordance with ASTM C635/C635M.
   2. Profile: Tee; 9/16 inch face width.
   3. Finish: Baked enamel.

2.04 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
B. Hanger Wire: 12 gauge, 0.08 inch galvanized steel wire.
C. Hold-Down Clips: Manufacturer's standard clips to suit application.
D. Perimeter Moldings: Same metal and finish as grid.
   1. Size: As required for installation conditions and specified Seismic Design Category.
   2. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
E. Gypsum Board: Fire rated type; 5/8 inch thick, ends and edges square, paper faced.
F. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that layout of hangers will not interfere with other work.

3.02 PREPARATION

A. Install after major above-ceiling work is complete.
B. Coordinate the location of hangers with other work.

3.03 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Overlap and rivet corners.
E. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
H. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
I. Do not eccentrically load system or induce rotation of runners.
J. Install light fixture boxes constructed of gypsum board above light fixtures in accordance with fire rated assembly requirements and light fixture ventilation requirements.

3.04 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer's instructions.
B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
C. Fit border trim neatly against abutting surfaces.
D. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
E. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.
F. Install hold-down clips on panels within 20 ft of an exterior door.

3.05 TOLERANCES

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

END OF SECTION
SECTION 12 48 13
ENTRANCE FLOOR MATS AND FRAMES

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Extruded aluminum entrance floor grilles.

1.02 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data indicating properties of walk-off surface, component dimensions and recessed frame characteristics.
   C. Shop Drawings: Indicate dimensions and details for recessed frame.
      1. For recessed frames located within a dimensionally restricted area, show dimensions of space within which the frame will be installed.
   D. Maintenance Data: Include cleaning instructions, and stain removal procedures.

PART 2 PRODUCTS
2.01 ENTRANCE FLOOR GRILLES AND GRATINGS
   A. Entrance Floor Grilles: Recessed extruded aluminum grille assembly with nominal 1 inch wide tread strips running perpendicular to traffic flow, slots between treads, and perimeter frame forming sides of recess; grille hinged for access to recess.
      1. Recess Depth: 3/4 inches.
      2. Tread Surfaces: Nylon carpet.
      5. Frame: Anodized aluminum for embedding in concrete; minimal exposed trim; stud or hook concrete anchors.
   B. Mounting: Top of non-resilient members level with adjacent floor.
   C. Structural Capacity: Capable of supporting a rolling load of 500 pounds without permanent deformation or noticeable deflection.
   D. Vibration Resistant Fabrication: All members welded, riveted, or bolted; no snap or friction connections.

2.02 FABRICATION
   A. Construct recessed mat frames square, tight joints at corners, rigid. Coat surfaces with protective coating where in contact with cementitious materials.
   B. Fabricate mats in single unit sizes; fabricate multiple mats where indicated on drawings.

PART 3 EXECUTION
3.01 EXAMINATION
3.02 PREPARATION
   A. Vacuum clean floor recess.

3.03 INSTALLATION
   A. Install frames to achieve flush plane with finished floor surface.
   B. Install walk-off surface in floor recess flush with finish floor after cleaning of finish flooring.

3.04 TOLERANCES

END OF SECTION
SECTION 26 05 05
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Electrical demolition.

1.02 RELATED REQUIREMENTS
A. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

1.03 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT
A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify field measurements and circuiting arrangements are as indicated.
B. Verify that abandoned wiring and equipment serve only abandoned facilities.
C. Demolition drawings are based on casual field observation and existing record documents.
D. Report discrepancies to Owner before disturbing existing installation.
E. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION
A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
B. Coordinate utility service outages with utility company.
C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
   2. Make temporary connections to maintain service in areas adjacent to work area.
E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner before partially or completely disabling system.
   2. Notify local fire service.
   3. Make notifications at least 24 hours in advance.
   4. Make temporary connections to maintain service in areas adjacent to work area.
F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
   1. Notify Owner at least 24 hours before partially or completely disabling system.
   2. Notify telephone utility company at least 24 hours before partially or completely disabling system.
   3. Make temporary connections to maintain service in areas adjacent to work area.
3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK
  A. Remove, relocate, and extend existing installations to accommodate new construction.
  B. Remove abandoned wiring to source of supply.
  C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
  D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
  E. Disconnect and remove abandoned panelboards and distribution equipment.
  F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
  G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
  H. Repair adjacent construction and finishes damaged during demolition and extension work.
  I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.04 CLEANING AND REPAIR
  A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.
  B. Clean and repair existing materials and equipment that remain or that are to be reused.
  C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
  D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION
SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Grounding and bonding requirements.
B. Conductors for grounding and bonding.
C. Connectors for grounding and bonding.
D. Ground rod electrodes.
E. Ground access wells.
F. Grounding and bonding components.
G. Provide all components necessary to complete the grounding system(s) consisting of:
   1. Existing metal underground water pipe.
   2. Metal frame of the building.
   3. Existing metal underground gas piping system.
   4. Metal underground gas piping system.

1.02 RELATED REQUIREMENTS
A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
C. Section 26 56 00 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

1.03 REFERENCE STANDARDS
B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
F. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Verify exact locations of underground metal water service pipe entrances to building.
   2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 PERFORMANCE REQUIREMENTS
A. Grounding System Resistance: 5 ohms.

1.06 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.
C. Shop Drawings:
D. Product Data: Provide for grounding electrodes and connections.
E. Test Reports: Indicate overall resistance to ground and resistance of each electrode.
F. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
G. Project Record Documents: Record actual locations of grounding electrode system components and connections.
H. Project Record Documents: Record actual locations of components and grounding electrodes.

1.07 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.
E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS
2.01 GROUNDING AND BONDING REQUIREMENTS
A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
D. Grounding System Resistance:
   1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
   2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
   3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.
E. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.
      b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
   2. Metal Underground Water Pipe(s):
a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.

3. Metal Building or Structure Frame:
   a. Provide connection to metal building or structure frame effectively grounded in accordance with NFPA 70 at nearest accessible location.

4. Ground Rod Electrode(s):
   a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
   b. Space electrodes not less than 10 feet from each other and any other ground electrode.
   c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
   d. Provide ground access well for each electrode.

5. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.

F. Service-Supplied System Grounding:
   1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
   2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.

G. Bonding and Equipment Grounding:
   1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
   2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
   3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
   4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
   5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
   6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
   7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
      a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
      b. Metal gas piping.
   8. Provide bonding for interior metal air ducts.
   9. Provide bonding for metal building frame where not used as a grounding electrode.

H. Pole-Mounted Luminaires: Also comply with Section 26 56 00.


2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
   1. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
   2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in addition to requirements of Section 26 05 19:
   1. Use insulated copper conductors unless otherwise indicated.
      a. Exceptions:
         1) Use bare copper conductors where installed underground in direct contact with earth.
         2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
   1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
   2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
      a. Exceptions:
         1) Use mechanical connectors for connections to electrodes at ground access wells.
   3. Unless otherwise indicated, use exothermic welded connections for accessible connections.
      a. Exceptions:
         1) Use exothermic welded connections for connections to metal building frame.

4. Manufacturers - Mechanical and Compression Connectors:
   d. Substitutions: See Section 01 60 00 - Product Requirements.

5. Manufacturers - Exothermic Welded Connections:
   d. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 MANUFACTURERS


D. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 CONNECTORS AND ACCESSORIES

A. Mechanical Connectors: Bronze.
   1. Substitutions: See Section 01 60 00 - Product Requirements.

B. Wire: Stranded copper.

C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.

B. Verify that field measurements are as shown on the drawings.
C. Verify that conditions are satisfactory for installation prior to starting work.
D. Verify existing conditions prior to beginning work.
E. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
C. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
D. Identify grounding and bonding system components in accordance with Section 26 05 53.
E. Provide bonding to meet requirements described in Quality Assurance.
F. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing. Each of branch circuits and feeder circuits shall have dedicated equipment grounding conductor, sharing this conductor with other grounding conductors is not permitted.

3.03 FIELD QUALITY CONTROL
A. Perform inspection in accordance with Section 01 40 00.
B. Inspect and test in accordance with NETA STD ATS except Section 4.
C. Perform inspections and tests listed in NETA STD ATS, Section 7.13.
D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION
SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.02  RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.
B. Section 05 50 00 - Metal Fabrications: Materials and requirements for fabricated metal supports.
C. Section 26 05 34 - Conduit: Additional support and attachment requirements for conduits.
D. Section 26 05 37 - Boxes: Additional support and attachment requirements for boxes.
E. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
F. Section 26 56 00 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.03  REFERENCE STANDARDS

D. MFMA-4 - Metal Framing Standards Publication; 2004.
E. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
G. UL 5B - Strut-Type Channel Raceways and Fittings; Current Edition, Including All Revisions.

1.04  ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.05  SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.
C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.
D. Installer's Qualifications: Include evidence of compliance with specified requirements.
E. Product Data: Provide manufacturer's catalog data for fastening systems.
F. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE
A. Comply with NFPA 70.
B. Comply with applicable building code.
C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
D. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator's license.
E. Installer Qualifications for Field-Welding: As specified in Section 05 50 00.
F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS
A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   2. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
B. Materials for Metal Fabricated Supports: Comply with Section 05 50 00.
C. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.
   3. Manufacturers:
a. Cooper Crouse-Hinds, a division of Eaton Corporation: 
   www.cooperindustries.com/#sle.
b. Erico International Corporation: 
   www.erico.com/#sle.
c. O-Z/Gedney, a brand of Emerson Industrial Automation: 
   www.emersonindustrial.com/#sle.
d. Thomas & Betts Corporation: 
   www.tnb.com/#sle.
e. Substitutions: See Section 01 60 00 - Product Requirements.

D. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
   1. Manufacturers:
      a. Cooper Crouse-Hinds, a division of Eaton Corporation: 
         www.cooperindustries.com/#sle.
b. Erico International Corporation: 
   www.erico.com/#sle.
c. O-Z/Gedney, a brand of Emerson Industrial Automation: 
   www.emersonindustrial.com/#sle.
d. Thomas & Betts Corporation: 
   www.tnb.com/#sle.
e. Substitutions: See Section 01 60 00 - Product Requirements.

E. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
   3. Channel Material:
      a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
   4. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
   6. Manufacturers:
c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
d. Substitutions: See Section 01 60 00 - Product Requirements.
e. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.

F. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
   1. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch diameter.
      b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch diameter.
      c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch diameter.
      d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
      e. Outlet Boxes: 1/4 inch diameter.
      f. Luminaires: 1/4 inch diameter.

G. Anchors and Fasteners:
   1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
   2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
   3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
   6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
   7. Sheet Metal: Use sheet metal screws.
   8. Powder-actuated fasteners are not permitted.
   9. Hammer-driven anchors and fasteners are not permitted.
10. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
   b. Channel Material: Use galvanized steel.
   c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

2.02 MANUFACTURERS
C. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 MATERIALS
A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
B. Supports: Fabricated of structural steel or formed steel members; galvanized.
C. Anchors and Fasteners:
   1. Do not use powder-actuated anchors.
   2. Obtain permission from Architect before using powder-actuated anchors.
   3. Concrete Structural Elements: Use precast inserts.
   4. Steel Structural Elements: Use beam clamps.
   5. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
   7. Solid Masonry Walls: Use expansion anchors.
D. Formed Steel Channel:
   2. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field measurements are as shown on the drawings.
B. Verify that mounting surfaces are ready to receive support and attachment components.
C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
A. Install products in accordance with manufacturer’s instructions.
B. Install support and attachment components in a neat and workmanlike manner in accordance with NECA 1.
C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
G. Equipment Support and Attachment:
   1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

H. Conduit Support and Attachment: Also comply with Section 26 05 34.
I. Box Support and Attachment: Also comply with Section 26 05 37.
J. Interior Luminaire Support and Attachment: Also comply with Section 26 51 00.
K. Exterior Luminaire Support and Attachment: Also comply with Section 26 56 00.
L. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.
M. Secure fasteners according to manufacturer's recommended torque settings.
N. Remove temporary supports.
O. Identify independent electrical component support wires above accessible ceilings (only where specifically indicated or permitted) with color distinguishable from ceiling support wires in accordance with NFPA 70.

3.03 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Inspect support and attachment components for damage and defects.
C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION
SECTION 26 05 33.23
SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface raceway systems.
B. Wireways.

1.02 RELATED REQUIREMENTS

A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
C. Section 26 05 34 - Conduit.
D. Section 26 05 37 - Boxes.
E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
F. Section 26 27 26 - Wiring Devices: Receptacles.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
D. UL 5 - Surface Metal Raceways and Fittings; Current Edition, Including All Revisions.
E. UL 111 - Outline of Investigation for Multioutlet Assemblies; Current Edition, Including All Revisions.
F. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
   2. Coordinate rough-in locations of outlet boxes provided under Section 26 05 37 and conduit provided under Section 26 05 34 as required for installation of raceways provided under this section.
   3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
   4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not install raceways until final surface finishes and painting are complete.
   2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
   1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.
C. Shop Drawings:
D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 RACEWAY REQUIREMENTS
A. Provide all components, fittings, supports, and accessories required for a complete raceway system.
B. Provide products listed, classified, and labeled as suitable for the purpose intended.
C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.02 SURFACE RACEWAY SYSTEMS
A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Surface Metal Raceways: Listed and labeled as complying with UL 5.
C. Multioutlet Assemblies: Listed and labeled as complying with UL 111.

2.03 WIREWAYS
A. Manufacturers:
   3. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.
C. Wireway Type, Unless Otherwise Indicated:
   1. Indoor Clean, Dry Locations: NEMA 250, Type 1, painted steel with screw-cover.
D. Finish for Painted Steel Wireways: Manufacturer's standard grey unless otherwise indicated.
E. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.04 SOURCE QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that field measurements are as indicated.
B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.
C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.
D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Perform work in accordance with NECA 1 (general workmanship).
C. Install raceways plumb and level.
D. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.
E. Secure and support raceways in accordance with Section 26 05 29 at intervals complying with NFPA 70 and manufacturer's requirements.
F. Close unused raceway openings.
G. Provide grounding and bonding in accordance with Section 26 05 26.
H. Identify raceways in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Inspect raceways for damage and defects.
C. Surface Raceway Systems with Integrated Devices: Test each wiring device to verify operation and proper polarity.
D. Correct wiring deficiencies and replace damaged or defective raceways.

3.04 CLEANING
A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.05 PROTECTION
A. Protect installed raceways from subsequent construction operations.

END OF SECTION
SECTION 26 05 34
CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Galvanized steel rigid metal conduit (RMC).
   B. Flexible metal conduit (FMC).
   C. Liquidtight flexible metal conduit (LFMC).
   D. Electrical metallic tubing (EMT).
   E. Rigid polyvinyl chloride (PVC) conduit.
   F. Conduit fittings.
   G. Accessories.
   H. Conduit, fittings and conduit bodies.

1.02 RELATED REQUIREMENTS
   A. Section 03 30 00 - Cast-in-Place Concrete: Concrete encasement of conduits.
   B. Section 07 84 00 - Firestopping.
   C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable
      (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses
      permitted.
   D. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
   E. Section 26 05 29 - Hangers and Supports for Electrical Systems.
   F. Section 26 05 37 - Boxes.
   G. Section 26 05 33.23 - Surface Raceways for Electrical Systems.
   H. Section 26 0553 - Identification for Electrical Systems.
   I. Section 26 05 53 - Identification for Electrical Systems: Identification products and
      requirements.

1.03 REFERENCE STANDARDS
   A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); 2015.
   B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.
   C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit -- Aluminum
      (ERMC-A); 2015.
   D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
   E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
   F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.
   G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic
      Tubing, and Cable; 2014.
   H. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having
      Jurisdiction, Including All Applicable Amendments and Supplements.
   I. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
   J. UL 6 - Electrical Rigid Metal Conduit-Steel; Current Edition, Including All Revisions.
   L. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
   M. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition,
      Including All Revisions.
1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

C. Shop Drawings:
   1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.
   2. Include proposed locations of roof penetrations and proposed methods for sealing.

D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

E. Product Data: Provide for metallic conduit and flexible metal conduit.

F. Samples of Materials Actually Delivered to Site:
   1. Two pieces each of conduit, 2 feet long.

G. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

D. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

D. Protect PVC conduit from sunlight.
PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
   1. Under Slab on Grade: Use rigid PVC conduit.
   2. Exterior, Direct-Buried: Use rigid PVC conduit.
   3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
   4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
   5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.

D. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit.

E. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

F. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

G. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

H. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit.

I. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
   1. Locations subject to physical damage include, but are not limited to:
      a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

J. Exposed, Exterior: Use galvanized steel rigid metal conduit.

K. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.

L. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
   1. Maximum Length: 6 feet.

M. Connections to Vibrating Equipment:
   1. Dry Locations: Use flexible metal conduit.
   2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
   3. Maximum Length: 6 feet unless otherwise indicated.
   4. Vibrating equipment includes, but is not limited to:
      a. Transformers.
      b. Motors.
      c. HVAC equipment.

N. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.02 CONDUIT REQUIREMENTS

A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.

C. Minimum Conduit Size, Unless Otherwise Indicated:
   1. Branch Circuits: 3/4 inch (21 mm) trade size.
   2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
   3. Control Circuits: 1/2 inch (16 mm) trade size.
   4. Flexible Connections to Luminaires: 1/2 inch (16 mm) trade size.
5. Underground, Interior: 3/4 inch (21 mm) trade size.
6. Underground, Exterior: 1 inch (27 mm) trade size.

D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
   4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 METAL CONDUIT

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Rigid Steel Conduit: ANSI C80.1.

C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.05 FLEXIBLE METAL CONDUIT (FMC)

A. Manufacturers:
   1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

C. Fittings:
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
D. Description: Interlocked steel construction.
E. Fittings: NEMA FB 1.

2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturers:
   1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.

2.07 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
   4. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.
   5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.
   6. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated,
Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

C. Fittings:
1. Manufacturer: Same as manufacturer of conduit to be connected.
2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.09 ACCESSORIES
A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.
C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.
D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that field measurements are as shown on drawings.
B. Verify that mounting surfaces are ready to receive conduits.
C. Verify that conditions are satisfactory for installation prior to starting work.
D. Verify routing and termination locations of conduit prior to rough-in.
E. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
E. Conduit Routing:
1. Unless dimensioned, conduit routing indicated is diagrammatic.
2. When conduit destination is indicated and routing is not shown, determine exact routing required.
3. Conceal all conduits unless specifically indicated to be exposed.
4. Conduits in the following areas may be exposed, unless otherwise indicated:
   a. Electrical rooms.
   b. Mechanical equipment rooms.
   c. Within joists in areas with no ceiling.
5. Unless otherwise approved, do not route conduits exposed:
   a. Across floors.
   b. Across roofs.
   c. Across top of parapet walls.
   d. Across building exterior surfaces.
6. Arrange conduit to maintain adequate headroom, clearances, and access.
7. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
8. Arrange conduit to provide no more than 150 feet between pull points.
9. Route conduits above water and drain piping where possible.
10. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.

11. Maintain minimum clearance of 6 inches between conduits and piping for other systems.

12. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
   a. Heaters.
   b. Hot water piping.
   c. Flues.

13. Group parallel conduits in the same area together on a common rack.

F. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
   4. Use conduit strap to support single surface-mounted conduit.
      a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
   5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
   6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
   7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
   8. Use of spring steel conduit clips for support of conduits is not permitted.
   9. Use of wire for support of conduits is not permitted.
      a. For securing conduits to studs in hollow stud walls.
      b. For suspending conduits supported by spring steel conduit clips (only where specifically indicated or permitted).

G. Connections and Terminations:
   1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
   2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
   3. Use suitable adapters where required to transition from one type of conduit to another.
   4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
   5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
   6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
   7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

H. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
   2. Make penetrations perpendicular to surfaces unless otherwise indicated.
   3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
   4. Conceal bends for conduit risers emerging above ground.
   5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
   6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
7. Make penetrations for roof-mounted equipment within associated equipment openings and
curbs where possible to minimize roofing system penetrations. Where penetrations are
necessary, seal as indicated or as required to preserve integrity of roofing system and
maintain roof warranty. Include proposed locations of penetrations and methods for sealing
with submittals.
8. Install firestopping to preserve fire resistance rating of partitions and other elements, using
materials and methods specified in Section 07 84 00.

I. Underground Installation:
   1. Provide trenching and backfilling in accordance with Section 31 23 16.13.
   2. Minimum Cover, Unless Otherwise Indicated or Required:
      b. Under Slab on Grade: 12 inches to bottom of slab.
   3. Provide underground warning tape in accordance with Section 26 05 53 along entire
      conduit length.

J. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated
to be concrete-encased, provide concrete in accordance with Section 03 30 00 with minimum
concrete cover of 3 inches on all sides unless otherwise indicated.

K. Hazardous (Classified) Locations: Where conduits cross boundaries of hazardous (classified)
locations, provide sealing fittings located as indicated or in accordance with NFPA 70.

L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion
and expansion/deflection fittings to prevent damage to enclosed conductors or connected
equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where conduits are subject to earth movement by settlement or frost.

M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial
temperature differential, provide sealing fitting or approved sealing compound at an accessible
point near the penetration to prevent condensation. This includes, but is not limited to:
   1. Where conduits pass from outdoors into conditioned interior spaces.
   2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

N. Provide pull string in all empty conduits and in conduits where conductors and cables are to be
installed by others. Leave minimum slack of 12 inches at each end.

O. Provide grounding and bonding in accordance with Section 26 05 26.

P. Identify conduits in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for additional requirements.
   B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by
      manufacturer. Replace components that exhibit signs of corrosion.
   C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING
   A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION
   A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection
      from entry of moisture and foreign material and do not remove until ready for installation of
      conductors.

3.06 INTERFACE WITH OTHER PRODUCTS
   A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials
      and methods specified in Section 07 8400.
B. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation specified in Section roofing section.

END OF SECTION
SECTION 26 05 37
BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.

B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.

C. Wall and ceiling outlet boxes.

D. Floor boxes.

E. Pull and junction boxes.

1.02 RELATED REQUIREMENTS

A. Section 07 84 00 - Firestopping.

B. Section 08 31 00 - Access Doors and Panels: Panels for maintaining access to concealed boxes.

C. Section 26 05 26 - Grounding and Bonding for Electrical Systems.

D. Section 26 05 29 - Hangers and Supports for Electrical Systems.

E. Section 26 05 34 - Conduit:
   1. Conduit bodies and other fittings.
   2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.

F. Section 26 05 33.23 - Surface Raceways for Electrical Systems:

G. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

H. Section 26 27 26 - Wiring Devices:
   1. Wall plates.

I. Section 26 2716 - Electrical Cabinets and Enclosures.

J. Section 26 2726 - Wiring Devices: Wall plates in finished areas, floor box service fittings, fire-rated poke-through fittings, and access floor boxes.

1.03 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.

B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.

C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.

D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.

E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports; 2013.

F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.


J. UL 508A - Industrial Control Panels; 2013.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
   4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
   5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
   6. Coordinate the work with other trades to preserve insulation integrity.
   7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
   8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.
E. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 BOXES

A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
   3. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
   4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
   1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
   2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
   3. Use suitable concrete type boxes where flush-mounted in concrete.
   4. Use suitable masonry type boxes where flush-mounted in masonry walls.
   5. Use raised covers suitable for the type of wall construction and device configuration where required.
   6. Use shallow boxes where required by the type of wall construction.
   7. Do not use "through-wall" boxes designed for access from both sides of wall.
   8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
   9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
   10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
   12. Minimum Box Size, Unless Otherwise Indicated:
       a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
   14. Manufacturers:
       b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
       e. Substitutions: See Section 01 60 00 - Product Requirements.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
   1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
   2. NEMA 250 Environment Type, Unless Otherwise Indicated:
       a. Indoor Clean, Dry Locations: Type 1, painted steel.
       b. Outdoor Locations: Type 3R, painted steel.
   3. Junction and Pull Boxes Larger Than 100 cubic inches:
       a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

2.02 MANUFACTURERS
   B. Steel City
   C. Substitutions: Reco, Inc. See Section 01 60 00 - Product Requirements.

2.03 OUTLET BOXES
   A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
      1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
      2. Concrete Ceiling Boxes: Concrete type.
   B. Nonmetallic Outlet Boxes: NEMA OS 2.
C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
D. Wall Plates for Finished Areas: As specified in Section 26 2726.

2.04 FLOOR BOXES
A. Floor Boxes: NEMA OS 1, fully adjustable, _4 inches deep.
B. Material: Cast metal.
C. Shape: Rectangular.
D. Service Fittings: As specified in Section 26 2726.

2.05 PULL AND JUNCTION BOXES
A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
B. Hinged Enclosures: As specified in Section 26 2716.
C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
   1. Material: Galvanized cast iron; Cast Aluminum.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
D. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:
   1. Material: Galvanized cast iron; Cast Aluminum.
   2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
   3. Cover Legend: "ELECTRIC".

PART 3 EXECUTION
3.01 EXAMINATION
3.02
A. Verify that field measurements are as shown on drawings.
B. Verify that mounting surfaces are ready to receive boxes.
C. Verify that conditions are satisfactory for installation prior to starting work.
D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

3.03 INSTALLATION
A. Install products in accordance with manufacturer’s instructions.
B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
C. Arrange equipment to provide minimum clearances in accordance with manufacturer’s instructions and NFPA 70.
D. Provide separate boxes for emergency power and normal power systems.
E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
F. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.
G. Box Locations:
   1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 31 00 as required where approved by the Architect.
   2. Unless dimensioned, box locations indicated are approximate.
   3. Locate boxes so that wall plates do not span different building finishes.
   4. Locate boxes so that wall plates do not cross masonry joints.
6. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.

7. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.

8. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
   a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
   b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.

9. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 05 34.

10. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
    a. Concealed above accessible suspended ceilings.
    b. Mechanical equipment rooms.
    c. __________.

H. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.

I. Install boxes plumb and level.

J. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
   3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

K. Install boxes as required to preserve insulation integrity.

L. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

M. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

N. Close unused box openings.

O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.

P. Provide grounding and bonding in accordance with Section 26 05 26.

Q. Identify boxes in accordance with Section 26 05 53.

R. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
S. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

T. Coordinate installation of outlet boxes for equipment connected under Section 26 2717.

U. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

V. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
   1. Adjust box locations up to 10 feet if required to accommodate intended purpose.

W. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726.

X. Maintain headroom and present neat mechanical appearance.

Y. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

Z. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.

AA. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

AB. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

AC. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

AD. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

AE. Use flush mounting outlet box in finished areas.

AF. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.

AG. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.

AH. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

AI. Use stamped steel bridges to fasten flush mounting outlet box between studs.

AJ. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

AK. Use adjustable steel channel fasteners for hung ceiling outlet box.

AL. Do not fasten boxes to ceiling support wires.

AM. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.

AN. Use gang box where more than one device is mounted together. Do not use sectional box.

AO. Use gang box with plaster ring for single device outlets.

AP. Use cast outlet box in exterior locations exposed to the weather and wet locations.

AQ. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

AR. Set floor boxes level.

AS. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.04 ADJUSTING

A. Adjust floor boxes flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closures in unused box openings.

3.05 CLEANING

A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.
3.06 PROTECTION

A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION
SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Electrical identification requirements.
B. Identification nameplates and labels.
C. Wire and cable markers.
D. Voltage markers.
E. Warning signs and labels.
F. Field-painted identification of conduit.

1.02  RELATED REQUIREMENTS
A. Section 09 90 00 - Painting and Coating.

1.03  REFERENCE STANDARDS
C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04  SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
B. Product Data: Provide catalog data for nameplates, labels, and markers.
C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.05  QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.

1.06  EXTRA MATERIALS
A. See Section 01 6000 - Product Requirements for additional requirements.

PART 2  PRODUCTS

2.01  IDENTIFICATION REQUIREMENTS
A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
B. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
   2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.02  MANUFACTURERS
D. Substitutions: See Section 01 60 00 - Product Requirements.
2.03 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
   2. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
   1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
   2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

D. Locations:
   1. Each electrical distribution and control equipment enclosure.
   2. Communication cabinets.
   3. Disconnect switches, and starters.

E. Letter Size:
   1. Use 1/8 inch letters for identifying individual equipment and loads.
   2. Use 1/4 inch letters for identifying grouped equipment and loads.

2.04 WIRE AND CABLE MARKERS

A. Manufacturers:
   1. Panduit Corp.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

H. Description: split sleeve type wire markers.

I. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.

J. Legend:
   1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
   2. Control Circuits: Control wire number indicated on shop drawings.

2.05 VOLTAGE MARKERS

A. Manufacturers: Panduit Corp
   1. Substitutions: See Section 01 60 00 - Product Requirements.

B. Minimum Size:
   1. Markers for Equipment: 1 1/8 by 4 1/2 inches.
   2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
   3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.

C. Legend:
   1. Markers for Voltage Identification: Highest voltage present.
   2. Markers for System Identification:
a. Emergency Power System: Text "EMERGENCY".
b. Other Systems: Type of service.

D. Color: Black text on orange background unless otherwise indicated.

E. Location: Furnish markers for each conduit longer than 6 feet.

F. Spacing: 20 feet on center.

G. Color:
   1. 480 Volt System: Brown.
   2. 208 Volt System: Yellow.

H. Legend:
   1. 480 Volt System: brown.
   2. 208 Volt System: yellow.

2.06 WARNING SIGNS AND LABELS

A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.

B. Warning Signs:
   1. Materials:
   2. Minimum Size: 7 by 10 inches unless otherwise indicated.

C. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION

3.01 PREPARATION

A. Clean surfaces to receive adhesive products according to manufacturer’s instructions.

B. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

A. Install products in accordance with manufacturer’s instructions.

B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Interior Components: Legible from the point of access.
   6. Conductors and Cables: Legible from the point of access.

C. Install identification products centered, level, and parallel with lines of item being identified.

D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

END OF SECTION
SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall switches.
B. Wall dimmers.
C. Receptacles.
D. Wall plates.
E. Floor box service fittings.

1.02 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
C. Section 26 05 33.23 - Surface Raceways: Surface raceway systems, including multioutlet assemblies.
D. Section 26 05 37 - Boxes.
E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
F. Section 26 09 23 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.
G. Section 26 05 83 - Equipment Wiring: Cords and plugs for equipment.
I. Section 27 10 05 - Structured Cabling for Voice and Data - Inside-Plant: Voice and data jacks.

1.03 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2017h.
B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); 2017g.
C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
L. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
6. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
D. Operation and Maintenance Data:
   1. GFCI Receptacles: Include information on status indicators.
E. Project Record Documents: Record actual installed locations of wiring devices.
F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Wall Plates: One of each style, size, and finish.
   3. Extra Flush Floor Service Fittings: Two of each type.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Products: Listed, classified, and labeled as suitable for the purpose intended.
E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND PROTECTION
A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

1.08 EXTRA MATERIALS
A. See Section 01 6000 - Product Requirements, for additional provisions.
B. Furnish two of each style, size, and finish wall plate.

PART 2 PRODUCTS
2.01 MANUFACTURERS
D. Pass & Seymour, a brand of Legrand North America, Inc; : www.legrand.us


G. Substitutions: See Section 01 60 00 - Product Requirements.

H. Source Limitations: Where possible, for each type of wiring device furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 APPLICATIONS

A. Provide wiring devices suitable for intended use and with ratings adequate for load served.

B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.

C. Provide weather resistant GFI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.

D. Provide GFI protection for all receptacles installed within 6 feet of sinks.

E. Provide GFCI protection for receptacles serving electric drinking fountains.

F. Unless noted otherwise, do not use combination switch/receptacle devices.

G. For flush floor service fittings, use carpet flanges for installations in carpeted floors.

2.03 ALL WIRING DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.04 WALL SWITCHES

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

   1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

C. Standard Wall Switches: Commercial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

D. Wall Switches: Heavy Duty, AC only general-use snap switch, complying with NEMA WD 6 and WD 1.
   1. Body and Handle: Black plastic with toggle handle.
   2. Ratings:
      a. Voltage: 120 - 277 volts, AC.
   3. Ratings: Match branch circuit and load characteristics.

E. Switch Types: Single pole, double pole, 3-way, and 4-way.

2.05 WALL DIMMERS

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Wall Dimmers: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air
gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.

C. Control: Slide control type with separate on/off switch.

2.06 RECEPTACLES

A. Manufacturers:
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

C. Convenience Receptacles:
1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
   a. Products:
      1) Hubbell Wiring Devices.
      2) Leviton.
      3) Pass & Saymore.
      4) Substitutions: See Section 01 60 00 - Product Requirements.

D. GFI Receptacles:
1. All GFI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A.

E. Receptacles: Heavy duty, complying with NEMA WD 6 and WD 1.
1. Device Body: Black plastic.
2. Configuration: NEMA WD 6, type as specified and indicated.

F. Convenience Receptacles: Type 5 - 20.

G. Single Convenience Receptacles.

H. Duplex Convenience Receptacles.

I. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.07 TELEPHONE JACKS

A. Product: AMP manufacturing

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.08 WALL PLATES

A. Manufacturers:
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Wall Plates: Comply with UL 514D.
1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
2. Size: Standard;
3. Screws: Metal with slotted heads finished to match wall plate finish.
C. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.
D. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.
E. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.
F. Decorative Cover Plates: stainless steel.
G. Jumbo Cover Plates: stainless steel.
H. Weatherproof Cover Plates: Gasketed cast metal with hinged cover.

2.09 FLOOR BOX SERVICE FITTINGS
A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Description: Service fittings compatible with floor boxes provided under Section 26 05 37 with all components, adapters, and trims required for complete installation.
C. Flush Floor Service Fittings:
   1. Dual Service Flush Combination Outlets:
      a. Cover: Rectangular.
      b. Configuration:
         1) Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
         2) Communications: Two Data Drops.
         3) Voice and Data Jacks: As specified in Section 27 10 00.
   2. Accessories:
      a. Carpet Flanges: Finish to match covers; configuration as required to accommodate specified covers.

2.10 POKE-THROUGH ASSEMBLIES
A. Description: Assembly comprising floor service fitting, poke-through component, fire stops and smoke barriers, and junction box for conduit termination; fire rating listed to match fire rating of floor and suitable for floor thickness where installed.
B. Flush Floor Service Fittings:
   1. Dual Service Flush Combination Outlets:
      a. Cover: Hinged door(s).
      b. Configuration:
         1) Power: One standard convenience duplex receptacle(s).
         2) Communications: Two data drops.
         3) Voice and Data Jacks: As specified in Section 27 10 00.
   2. Accessories:
      a. Closure Plugs: Size and fire rating as required to seal unused core hole and maintain fire rating of floor.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that field measurements are as shown on the drawings.
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
D. Verify that final surface finishes are complete, including painting.
E. Verify that floor boxes are adjusted properly.
F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
G. Verify that openings in access floor are in proper locations.
H. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION
A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION
A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
B. Perform work in a neat and workmanlike manner in accordance with NECA 1, including mounting heights specified in that standard unless otherwise indicated.
C. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of wiring devices provided under this section.
   1. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
   2. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
D. Install wiring devices in accordance with manufacturer's instructions.
E. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
F. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
G. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
H. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
I. For isolated ground receptacles, connect wiring device grounding terminal only to identified branch circuit isolated equipment grounding conductor. Do not connect grounding terminal to outlet box or normal branch circuit equipment grounding conductor.
J. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.
K. Install securely, in a neat and workmanlike manner, as specified in NECA 1.
L. Install wiring devices plumb and level with mounting yoke held rigidly in place.
M. Install wall switches with OFF position down.
N. Do not share neutral conductor on branch circuits utilizing wall dimmers.
O. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
P. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or
improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

Q. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

R. Install poke-through closure plugs in each unused core holes to maintain fire rating of floor.

S. Install receptacles with grounding pole on top.

T. Connect wiring device grounding terminal to outlet box with bonding jumper.

U. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

V. Connect wiring devices by wrapping conductor around screw terminal.

W. Use jumbo size plates for outlets installed in masonry walls.

X. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 05 37 to obtain mounting heights.

B. Install wall switch 48 inches above finished floor.

C. Install convenience receptacle 18 inches above finished floor.

D. Install convenience receptacle 6 inches above backsplash of counter.

E. Install telephone jack 18 inches above finished floor.

F. Install telephone jack for side-reach wall telephone to position top of telephone at 54 inches above finished floor.

G. Install telephone jack for forward-reach wall telephone to position top of telephone at 48 inches above finished floor.

H. Coordinate installation of access floor boxes with access floor system provided under Section 09 6900.

I. Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 26 0540.

3.05 FIELD QUALITY CONTROL

A. Perform field inspection, testing, adjusting, and balancing in accordance with Section 01 40 00.

B. Inspect each wiring device for damage and defects.

C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

D. Operate each wall switch with circuit energized and verify proper operation.

E. Verify that each receptacle device is energized.

F. Test each receptacle to verify operation and proper polarity.

G. Test each GFCI receptacle for proper tripping operation according to manufacturer’s instructions.

H. Correct wiring deficiencies and replace damaged or defective wiring devices.

I. Verify that each telephone jack is properly connected and circuit is operational.

3.06 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.07 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION
SECTION 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires.
B. Emergency lighting units.
C. Exit signs.
D. Ballasts.
E. Lamps.
F. Luminaire accessories.

1.02 RELATED REQUIREMENTS

A. Section 26 05 37 - Boxes.
B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
C. Section 26 09 23 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.
D. Section 26 27 26 - Wiring Devices: Manual wall switches and wall dimmers.

1.03 REFERENCE STANDARDS

C. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type); 2002.
H. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
K. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility; 2012.
L. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association; 2002.
M. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
P. UL 935 - Fluorescent-Lamp Ballasts; Current Edition, Including All Revisions.
Q. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
   2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
   3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
   4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Shop Drawings:
   1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
   2. Provide photometric calculations where luminaires are proposed for substitution upon request.
C. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
D. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.
      b. Include IES LM-79 test report upon request.
E. Sustainable Design Documentation: Submit manufacturer's product data on lamp mercury content and rated lamp life, showing compliance with specified requirements.
F. Field Quality Control Reports.
G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
H. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than one of each type.
   3. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.
   4. Extra Ballasts: Two percent of total quantity installed for each type, but not less than one of each type.
J. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Conform to requirements of NFPA 70 and NFPA 101.
D. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND PROTECTION
A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.08 FIELD CONDITIONS
A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Provide two year manufacturer warranty for all linear fluorescent ballasts.

1.10 EXTRA MATERIALS
A. See Section 01 6000 - Product Requirements, for additional provisions.
B. Furnish two of each plastic lens type.
C. Furnish one replacement lamps for each lamp type.
D. Furnish two of each ballast type.

PART 2 PRODUCTS
2.01 MANUFACTURERS
E. Columbia Lighting.
F. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LUMINAIRES
A. Manufacturers:
   2. Cooper Lighting, a division of Cooper Industries; www.cooperindustries.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Provide products that comply with requirements of NFPA 70.
C. Provide products that are listed and labeled as complying with UL 1598, where applicable.
D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

H. Recessed Luminaires:
   2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.

I. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 200,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

J. LED Luminaires: Listed and labeled as complying with UL 8750.

K. Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.

L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.03 EMERGENCY LIGHTING UNITS

A. Manufacturers:
   2. Cooper Lighting, a division of Cooper Industries; : www.cooperindustries.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924. Emergency and Exit light combination unit with (2) unit mounted lamps and LED exit light with battery backup. This combination unit shall have spare capacity to power remote emergency lamp heads.

C. Operation: Upon disruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

D. Battery:
   1. Sealed maintenance-free nickel cadmium unless otherwise indicated.
   2. Size battery to supply all connected lamps, including emergency remote heads where indicated.

E. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.

F. Provide low-voltage disconnect to prevent battery damage from deep discharge.

G. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.

H. Accessories:
1. Provide compatible accessory mounting brackets where indicated or required to complete installation.
2. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
3. Provide compatible accessory wire guards where indicated.
4. Where indicated, provide emergency remote heads that are compatible with the emergency lighting unit they are connected to and suitable for the installed location.

2.04 LUMINAIRES
A. Furnish products as indicated in Schedule attached to this section.
B. Substitutions: See Section 01 60 00 - Product Requirements.
   1. Input Voltage: 120 or 277 volts.

2.05 EXIT SIGNS
A. Manufacturers:
   2. Cooper Lighting, a division of Cooper Industries; : www.cooperindustries.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
   1. Number of Faces: Single or double as indicated or as required for the installed location.
   2. Directional Arrows: As indicated or as required for the installed location.
C. Self-Powered Exit Signs:
   1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
   2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
   3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
   4. Provide low-voltage disconnect to prevent battery damage from deep discharge.
   5. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.
D. Accessories:
   1. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
   2. Provide compatible accessory wire guards where indicated.
E. Manufacturers: As indicated on lighting fixture schedule.
   1. Substitutions: See Section 01 60 00 - Product Requirements.
F. Exit Signs: Exit sign fixture.
   2. Face: Translucent glass face with red letters on white background.
   3. Face: Aluminum stencil face with red letters.
   4. Directional Arrows: Universal type for field adjustment.
   5. Mounting: Universal, for field selection.
   6. Battery: 12 volt, nickel-cadmium type, with 1.5 hour capacity.
   7. Battery Charger: Dual-rate type, with sufficient capacity to recharge discharged battery to full charge within twelve hours.
   8. Lamps: Manufacturer's standard.

2.06 BALLASTS
A. Manufacturers:
2. Osram Sylvania; : www.sylvania.com/#sle.
4. Substitutions: See Section 01 60 00 - Product Requirements.
5. Manufacturer Limitations: Where possible, for each type of luminaire provide ballasts produced by a single manufacturer.

B. All Ballasts:
1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

C. Fluorescent Ballasts:
1. All Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
   a. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
   b. Total Harmonic Distortion: Not greater than 10 percent.
   c. Power Factor: Not less than 0.95.
   d. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
   e. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
   f. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
   g. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
      1) Do not operate lamp(s) within the frequencies from 30 kHz through 40 kHz in order to avoid interference with infrared devices.
   h. Lamp Current Crest Factor: Not greater than 1.7.
   i. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
   j. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
   k. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
   l. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.
   m. Provide high efficiency T8 lamp ballasts certified as NEMA premium where indicated.
   n. Ballast Marking: Include wiring diagrams with lamp connections.
2. Non-Dimming Fluorescent Ballasts:
   a. Lamp Starting Method:
      1) T8 Lamp Ballasts: Programmed start unless otherwise indicated.
      2) T5 Lamp Ballasts: Programmed start unless otherwise indicated.
      3) Compact Fluorescent Lamp Ballasts: Programmed start unless otherwise indicated.
   b. Lamp Starting Temperature: Capable of starting standard lamp(s) at a minimum of 0 degrees F, and energy saving lamp(s) at a minimum of 60 degrees F unless otherwise indicated.

2.07 LAMPS

A. Manufacturers:
2. Osram Sylvania; : www.sylvania.com/#sle.
5. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Lamps:
1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer’s recommendations.
3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.

2.08 ACCESSORIES
A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2” size, factory finished to match luminaire or field-painted as directed.
B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4” size, field-painted as directed.
C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.
D. Tube Guards for Linear Fluorescent Lamps: Provide clear virgin polycarbonate sleeves with endcaps where indicated.
E. Product: As indicated in lighting fixture schedule.
   1. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that field measurements are as shown on the drawings.
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
C. Verify that suitable support frames are installed where required.
D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION
A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION
A. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of luminaires provided under this section.
B. Install products according to manufacturer’s instructions.
C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).
D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
E. Suspended Ceiling Mounted Luminaires:
   1. Do not use ceiling tiles to bear weight of luminaires.
   2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
   3. Secure pendant-mounted luminaires to building structure.
   4. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
   5. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
6. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.

F. Recessed Luminaires:
1. Install trims tight to mounting surface with no visible light leakage.
2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.

G. Suspended Luminaires:
1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
2. Install canopies tight to mounting surface.

H. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

I. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).

J. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

K. Support luminaires independent of ceiling framing.

L. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

M. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

N. Exposed Grid Ceilings: Support surface mounted luminaires in grid ceiling directly from building structure.

O. Exposed Grid Ceilings: Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires.

P. Exposed Grid Ceilings: Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.

Q. Install recessed luminaires to permit removal from below.

R. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

S. Install clips to secure recessed grid-supported luminaires in place.

T. Install wall mounted luminaires, emergency lighting units, and exit signs at height as scheduled.

U. Install accessories furnished with each luminaire.

V. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

W. Bond products and metal accessories to branch circuit equipment grounding conductor.

X. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

Y. Air Handling Luminaires: Interface with air handling accessories furnished and installed under Section 23 36 00.

Z. Emergency Lighting Units:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

AA. Exit Signs:
1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.
AB. Install lamps in each luminaire.
AC. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

3.04 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Inspect each product for damage and defects.
C. Perform field inspection, testing, and adjusting in accordance with Section 01 4000.
D. Operate each luminaire after installation and connection to verify proper operation.
E. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
F. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 ADJUSTING
A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.
B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.
C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.
D. Aim and adjust luminaires as indicated.
E. Position exit sign directional arrows as indicated.

3.06 CLEANING
A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.
B. Clean electrical parts to remove conductive and deleterious materials.
C. Remove dirt and debris from enclosures.
D. Clean photometric control surfaces as recommended by manufacturer.
E. Clean finishes and touch up damage.

3.07 CLOSEOUT ACTIVITIES
A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
B. Just prior to Substantial Completion, replace all lamps that have failed.

3.08 PROTECTION
A. Protect installed luminaires from subsequent construction operations.

3.09 PROTECTION
A. Relamp luminaires that have failed lamps at Substantial Completion.

3.10 SCHEDULE - ATTACHED

END OF SECTION
SECTION 26 56 00
EXTERIOR LIGHTING

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Exterior luminaires.
B. Ballasts.
C. Lamps.
D. Luminaire accessories.

1.02  RELATED REQUIREMENTS
A. Section 03 30 00 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles.
B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
C. Section 26 05 37 - Boxes.
D. Section 26 06 50.16 - Lighting Fixture Schedule.
E. Section 26 06 50.16 - Luminaire Schedule.

1.03  REFERENCE STANDARDS
D. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
G. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.04  ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
   2. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05  SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Shop Drawings:
   1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
   2. Provide photometric calculations where luminaires are proposed for substitution.
C. Product Data: Provide manufacturer’s standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
1. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IESNA LM-63 standard format upon request.
2. Lamps: Include rated life and initial and mean lumen output.

D. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

F. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

H. Project Record Documents: Record actual connections and locations of pole foundations, luminaires, and any pull or junction boxes.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

C. Receive, handle, and store wood poles in accordance with ANSI O5.1.

PART 2 PRODUCTS

2.01 MANUFACTURERS


C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the Drawings.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 LUMINAIRES

A. Manufacturers:
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Provide products that comply with requirements of NFPA 70.

C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

H. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

I. LED Luminaire Components: UL 8750 recognized or listed as applicable.

J. Exposed Hardware: Stainless steel.

2.04 BALLASTS

A. Manufacturers:
   2. Osram Sylvania; www.sylvania.com/#sle.

B. All Ballasts:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

2.05 LAMPS

A. Manufacturers:
   2. Osram Sylvania; www.sylvania.com/#sle.

B. All Lamps:
   1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
   2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
   3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
   4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.

2.06 ACCESSORIES

A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.

C. Verify that suitable support frames are installed where required.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION
   A. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of luminaires provided under this section.
   B. Install products according to manufacturer's instructions.
   C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).
   D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
   E. Install accessories furnished with each luminaire.
   F. Bond products and metal accessories to branch circuit equipment grounding conductor.
   G. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for additional requirements.
   B. Inspect each product for damage and defects.
   C. Operate each luminaire after installation and connection to verify proper operation.
   D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 ADJUSTING
   A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

3.06 CLEANING
   A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.07 CLOSEOUT ACTIVITIES
   A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
   B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

3.08 PROTECTION
   A. Protect installed luminaires from subsequent construction operations.

END OF SECTION
SECTION 28 13 00
ACCESS CONTROL

PART 1  GENERAL

1.01 SECTION INCLUDES
A. Access control system requirements.
B. Access control units and software.
C. Access control point peripherals, including readers.
D. Accessories.

1.02 RELATED REQUIREMENTS
A. Section 07 84 00 - Firestopping.
B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
C. Section 26 05 34 - Conduit.
D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
E. Section 28 16 00 - Building Intrusion Detection: For interface with access control system.

1.03 REFERENCE STANDARDS
A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate the work with other installers to provide suitable door hardware as required for both access control functionality and code compliance.
   2. Coordinate the placement of readers with millwork, furniture, equipment, etc. installed under other sections or by others.
   3. Coordinate the work with other installers to provide power for equipment at required locations.
   4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.
C. Product Data: Provide manufacturer’s standard catalog pages and data sheets for each system component. Include ratings, configurations, standard wiring diagrams, dimensions, finishes, service condition requirements, and installed features.
D. Design Data: Standby battery/UPS calculations.
E. Certify that proposed system design and components meet or exceed specified requirements.
F. Evidence of qualifications for installer.
G. Evidence of qualifications for maintenance contractor (if different entity from installer).
H. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

I. Manufacturer's detailed field testing procedures.

J. Field quality control test reports.

K. Maintenance contracts.

L. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.

M. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
   1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.

N. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

O. Software: One copy of software not resident in read-only memory.

P. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE

A. Comply with the following:
   1. NFPA 70
   3. The requirements of the local authorities having jurisdiction.
   4. Applicable TIA/EIA standards.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with access control systems of similar size, type, and complexity and providing contract maintenance service as a regular part of their business; authorized manufacturer's representative.
   1. Contract maintenance office located within 100 miles of project site.

E. Maintenance Contractor Qualifications: Same entity as installer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

1.08 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.
PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Access Control System - Match/extend existing system. Contractor to verify type and components in field.
   B. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.
   C. Source Limitations: Where possible, furnish system components and accessories produced by a single manufacturer and obtained from a single supplier.

2.02 ACCESS CONTROL SYSTEM REQUIREMENTS
   A. Provide modifications and extensions to existing access control system consisting of all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
   B. Access Control Points:
      1. See drawings.
   C. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
      1. Access Control Units and Readers: Listed and labeled as complying with UL 294.

2.03 ACCESS CONTROL UNITS AND SOFTWARE
   A. Provide access control units and associated software compatible with readers to be connected.

2.04 ACCESS CONTROL POINT PERIPHERALS
   A. Provide devices compatible with control units.
   B. Provide devices suitable for operation under the service conditions at the installed location.
   C. Provide readers compatible with credentials to be used and match existing.
   D. Proximity Readers:
      1. Utilizes 125 kHz RF communication with compatible credentials.

2.05 ACCESSORIES
   A. Provide components as indicated or as required for connection of access control system to devices and other systems indicated.
   B. Unless otherwise indicated, credentials to be provided by Contractor.
      1. Provide credentials compatible with readers and control units/software to be used.
   C. Provide cables as indicated or as required for connections between system components.
   D. Provide accessory racks/cabinets as indicated or as required for equipment mounting.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field measurements are as shown on the drawings.
   B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
   C. Verify that mounting surfaces are ready to receive system components.
   D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.
   E. Verify that conditions are satisfactory for installation prior to starting work.
3.02 INSTALLATION
   A. Install access control system in accordance with NECA 1 (general workmanship).
   B. Install products in accordance with manufacturer's instructions.
   C. Wiring Method: Unless otherwise indicated, use wiring in conduit.
      1. Use suitable listed cables in wet locations, including underground raceways.
      2. Use suitable listed cables for vertical riser applications.
      3. Conduit: Comply with Section 26 05 34.
      4. Use power transfer hinges complying with Section 08 71 00 for concealed connections to door hardware.
      5. Do not exceed manufacturer's recommended maximum cable length between components.
   D. Provide grounding and bonding in accordance with Section 26 05 26.
   E. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
   F. Identify system wiring and components in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for additional requirements.
   B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
   C. Prepare and start system in accordance with manufacturer's instructions.
   D. Program system parameters according to requirements of Owner.
   E. Test for proper interface with other systems.
   F. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.
   G. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.04 CLEANING
   A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.05 CLOSEOUT ACTIVITIES
   A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
   B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
   C. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
   D. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
      1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
      2. Provide minimum of four hours of training.
      3. Instructor: Manufacturer's authorized representative.
      4. Location: At project site.

3.06 PROTECTION
   A. Protect installed system components from subsequent construction operations.

3.07 MAINTENANCE
   A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.
B. Provide to Owner, a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of access control system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

C. Conduct site visit at least once every three months to perform inspection, testing, and preventive maintenance. Submit report to Owner indicating maintenance performed along with evaluations and recommendations.

D. Provide trouble call-back service upon notification by Owner:
   1. Include allowance for call-back service during normal working hours at no extra cost to Owner.
   2. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

END OF SECTION