

Project Manual For:

BID # 37-17

FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL

Portsmouth, New Hampshire

John P. Bohenko, City Manager

Construction Documents – For Bid Only

Project 16-042-00

17 February 2017



LAVALLEE | BRENSINGER ARCHITECTS

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**SECTION 00 01 03
PROJECT DIRECTORY**

OWNER

City of Portsmouth, Portsmouth City Hall

1 Junkins Avenue, Portsmouth, New Hampshire 03801

Telephone: 603-431-2000

Contact: John P. Bohenko, City Manager

ARCHITECT

Lavallee Brensinger Architects (LBA)

155 Dow Street, Suite 400, Manchester, New Hampshire 03101

Telephone NH: 603-622-5450 E-mail: Robert.Robicsek@lbpa.com

Contact: Robert Robicsek, Principal

CONSULTANTS

CIVIL ENGINEER

Tighe & Bond

177 Corporate Drive, Portsmouth, New Hampshire 03801

Telephone: 603-433-8818 E-mail: PMCrimmins@tighebond.com

Contact: Patrick M. Crimmins, P.E.

STRUCTURAL ENGINEER

Becker Structural Engineers, Inc.

75 York Street, Portland, Maine 04101

Telephone: 207-879-1838 E-mail: ethan@beckerstructural.com

Contact: Ethan Rhile, P.E.

FIRE PROTECTION, PLUMBING, MECHANICAL, ELECTRICAL ENGINEERS

Allied Engineering

160 Veranda Street, Portland, Maine 04103

Telephone: 207-221-2260 E-mail: imacdonald@allied-eng.com

Contact: Ian MacDonald, P.E.

OWNER'S CONSULTANTS

GEOTECHNICAL ENGINEER

City of Portsmouth, Department of Public Works

60 Peverly Hill Road, Portsmouth, New Hampshire 03801

Telephone: 603-427-1530

Contact: Peter H Rice, P.E.

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END OF SECTION

SECTION 1-A
INVITATION TO BID

Portsmouth, New Hampshire
Department of Public Works

FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL Bid #37-17
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INVITATION TO BID

Sealed bid proposals, **plainly marked, FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL**, Bid Proposal #37-17 **on the outside of the mailing envelope as well as the sealed bid envelope**, addressed to the Finance/Purchasing Department, City Hall, 1 Junkins Avenue, Portsmouth, New Hampshire, 03801, will be accepted until **Monday, May 22, 2017 at 2:00 p.m.**; at which time all bids will be publicly opened and read aloud. A mandatory pre-bid walkthrough will be held at the site on **Tuesday, May 2, 2017 at 10:30 a.m.**

This project consists of removal and disposal of brick veneer fenestration and windows on the north, east, south and west facade of the City Hall and Police Department building, followed by replacement of the building fenestration with new masonry cavity wall assembly, curtainwall and windows assemblies also including an addition at the PD entrance. The project will require a phased approach to accommodate existing City Hall and Police Department operations and occupation of the building and site throughout construction.

Work may begin at any time after the notice to proceed is issued, on or before **Monday, June 5, 2017**. Final Completion of the project is expected to be by **June 1, 2018**. Hours of work will be 7AM to 5 PM Monday thru Friday. It is deemed reasonable by the Owner that the schedule provided and hours available are sufficient to complete the scope of work indicated. Additional hours and Saturday access may be made available to the Contractor if deemed necessary to complete the scope of work within the calendar period indicated. Bid proposals shall indicate the schedule intent of the Contractor for prior consideration and approval by the Owner. Bid proposals shall include any/all associated costs related to such additional hours or Saturday work to complete the scope of work by the date indicated.

The Contractor will be required to keep roadways and sidewalks passable for the public and employees at all times, and for ensuring that the public will be able to access the different areas of the City Hall and the PD at all times., and that work inside the building is disturbed to the least degree possible.

Bidders must determine the quantities of work required and the conditions under which the work will be performed.

Specifications may be obtained at the City's website: <http://www.cityofportsmouth.com/finance/purchasing.htm> Bidders may send questions by email to Dan Hartrey, Project Manager, at djhartrey@cityofportsmouth.com. Questions will be accepted until **noon on Monday, May 8, 2017**. Addenda to this project, if any, including written answers to questions, will not be provided directly to vendors, but will be posted by **4:00 p.m., on Monday May 15, 2017** on the City of Portsmouth Website under the project heading.

Electronic copies of the plans and specifications may be obtained off of the City's webpage. Documents are not available for pickup.

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts. The City of Portsmouth further reserves the right to reject any or all bids, to waive technical or legal deficiencies, to re-bid, and to accept any bid that it may deem to be in the best interest of the City. Also, the City reserves the right to approve or deny subcontractors for this project. An award of this project is contingent upon additional process and funding.

Each Bidder shall furnish a bid security in the amount of ten percent (10%) of the bid. The Bid Security may be in the form of a certified check or a bid bond executed by a surety company authorized to do business in the State of New Hampshire, made payable to the City of Portsmouth, N.H.

SECTION 1-B **INSTRUCTIONS TO BIDDERS**

Portsmouth, New Hampshire
Department of Public Works

BIDDING REQUIREMENTS AND CONDITIONS

1. Special Notice to Bidders

Appended to these instructions is a complete set of bidding and general contract forms. These forms may be detached and executed for the submittal of bids. The plans, specifications, and other documents designated in the proposal form will be considered as part of the proposal, whether attached or not.

The bidders must submit a statement of bidder's qualifications, if requested, subsequent to bid opening but prior to award.

Addenda to this bid document, if any, including written answers to questions, will be posted by 4:00 p.m., on Monday, May 15, 2017 on the City of Portsmouth website at <http://www.cityofportsmouth.com/finance/purchasing.htm> under the project heading. Addenda and updates will **NOT be sent directly to firms. Contractors submitting a bid should check the web site daily for addenda and updates after the release date. Firms should print out, sign and return addenda with the proposal. Failure to do so may result in disqualification.**

2. Examination of Plans, Specifications and Site Work

The bidder is expected to examine carefully the site of the proposed work, the plans, standard specifications, supplemental specifications, special provisions and contract forms before submitting a proposal. The submission of a bid shall be considered conclusive evidence that the bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and as to the requirements of the contract. It will be conclusive evidence that the bidder has also investigated and is satisfied with the sources of supply for all materials.

Plans, surveys, measurements, dimensions, calculations, estimates and statements as to the condition under which the work is to be performed are believed to be correct, but the contractors must examine for themselves, as no allowance will be made for any errors or inaccuracies that maybe found therein.

3. Familiarity with Laws

The bidder is assumed to have made himself or herself familiar with all federal and state laws and all local by-laws, ordinances and regulations which in any manner affect those engaged or employed on the work or affect the materials or equipment used in the work or affect the conduct of the work, and the bidder, if awarded the contract, shall be obligated to perform the work in conformity with said laws, by-laws, ordinances and regulations notwithstanding its ignorance thereof. If the bidder shall discover any provision in the plans or specifications which is in conflict with any such law, by-law, ordinance or regulation the bidder shall forthwith report it to the Owner and Architect in writing.

4. Preparation of Proposal

a) The bidder shall submit its proposal upon the forms furnished by the Owner. The bidder shall specify a lump sum price in figures, for each pay Division representative of the scope of work indicated per the Specifications and as represented on Drawings and the total amount of the proposal obtained by adding the amount of the several items. All words and figures shall be in ink or typed.

If a unit price or a lump sum bid already entered by the bidder on the proposal form is to be altered it should be crossed out with ink, the new unit price or lump sum bid entered above or below it and initialed by the bidder, also with ink.

b) The bidder's proposal must be signed with ink by the individual, by one or more general partners of a partnership, by one or more members or officers of each firm representing a joint venture; by one or more officers of a corporation, by one or more members (if member-managed) or managers (if manager-managed) of a limited liability company, or by an agent of the contractor legally qualified and acceptable to the owner. If the proposal is made by an individual, his or her name and post office address must be shown, by a partnership the name and post office address of each general and limited partner must be shown; as a joint venture, the name and post office address of each venturer must be shown; by a corporation, the name of the corporation and its business address must be shown, together with the name of the state in which it is incorporated, and the names, titles and business addresses of the president, secretary and treasurer.

5. Nonconforming Proposals

Proposals will be considered nonconforming and may be rejected in the Owner's sole discretion for any of the following reasons:

- If the proposal is on a form other than that furnished by the Owner, or if the form is altered or any portion thereof is detached;
- If there are unauthorized additions, conditional or altered bids, or irregularities of any kind which may tend to make the proposal or any portion thereof incomplete, indefinite or ambiguous as to its meaning;
- If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award; or
- If the proposal does not contain a unit price for each pay item listed except in the case of authorized alter pay items.

6. Proposal Guaranty

No proposal will be considered unless accompanied by a bid bond, surety, or similar guaranty of the types and in an amount not less than the amount indicated in the Invitation to Bid. All sureties shall be made payable to the "City of Portsmouth". If a bid bond is used by the bidder it shall be:

- In a form satisfactory to the Owner;
- With a surety company licensed, authorized to do business in, and subject to the jurisdiction of the courts of the State of New Hampshire; and
- Conditioned upon the faithful performance by the principal of the agreements contained in the sub-bid or the general bid.

In the event any irregularities are contained in the proposal guaranty, the bidder will have four business days (not counting the day of opening) to correct any irregularities. The corrected guaranty must be received by 4:00 p.m. If irregularities are not corrected to the satisfaction of the Owner, the Owner, in its sole discretion, may rejected the bid.

7. Delivery of Proposals

When sent by mail, the sealed proposal shall be addressed to the Owner at the address and in the care of the official in whose office the bids are to be received. All proposals shall be filed prior to the time and at the place specified in the invitation for bids. Proposals received after the time for opening of the bids will be "returned to sender", unopened.

8. Withdrawal of Proposals

A bidder will be permitted to withdraw his or her proposal unopened after it has been submitted if the Owner receives a request for withdrawal in writing prior to the time specified for opening the proposals.

9. Public Opening of Proposals

Proposals will be opened and read publicly at the time and place indicated in the invitation for bids. Bidders, their authorized agents, and other interested parties are invited to be present.

10. Disqualification of Bidders

Any or all of the following reasons may be deemed by Owner in its sole discretion as being sufficient for the disqualification of a bidder and the rejection of his proposal:

- More than one proposal for the same work from an individual, firm, or corporation under the same or different name;
- Evidence of collusion among bidders;
- Failure to submit all required information requested in the bid specifications;
- Lack of competency or of adequate machinery, plant or other equipment, as revealed by the statement of bidders qualification or otherwise;
- Uncompleted work which, in the judgment of the owner, might hinder or prevent the prompt completion of additional work if awarded;
- Failure to pay, or satisfactorily settle, all bills due for labor and materials on former contracts;
- Default or unsatisfactory performance on previous contracts; or
- Such disqualification would be in the best interests of the Owner.

11. Material Guaranty and Samples

Before any contract is awarded, the bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all materials to be used in the construction of the work, and the Owner may, in its sole discretion, reject the bid based on the contents of the statement or as a result of the failure of the bidder to submit the statement.

SECTION 1-C
AWARD AND EXECUTION OF CONTRACT

Portsmouth, New Hampshire
Department of Public Works

1. Consideration of Proposals

After the proposals are opened and read, they will be compared on the basis of the total price for all sections of work, plus such of the Alternates as the Owner desires to use and any such additional considerations as may be identified in the bid documents. The results of such comparisons will be immediately available to the public. In case of a discrepancy between the prices written in words and those written figures, the prices written in words shall govern. In case of a discrepancy between the total shown in the proposal and that obtained by adding each pay Division , the latter shall govern.

2. Award of Contract

Within 30 calendar days after the opening of proposals, if a contract is to be awarded, the award will be made to the lowest responsible and qualified bidder whose proposal complies with all the requirements prescribed. The successful bidder will be notified, in writing, mailed to the address on his or her proposal, that his or her bid has been accepted and that the bidder has been awarded the contract.

3. Reservation of Rights

The Owner reserves the right to reject any or all proposals, to waive technicalities or to advertise for new proposals, if, in the sole discretion of the Owner, the best interest of the City of Portsmouth will be promoted thereby. The Owner further reserves the right to conduct such investigations of the contractor's history, financial resources, and other qualifications as it deems necessary to determine whether bidder is qualified to do the work. Bidder may be asked to execute releases. Failure to execute a release upon request may result in disqualification.

The Owner reserves the right to cancel the award of any contract at any time before the execution of such contract by all parties without any liability of the Owner.

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts. An award of this project is contingent upon additional process and funding.

4. Return of Proposal Guaranty

All proposal guaranties, except those of the three lowest bidders, will be returned upon request following the opening and checking of the proposals. The proposal guaranties of the three lowest bidders will be returned within ten days following the award of the contract if requested.

5. Contract Bonds

At the time of the execution of the contract, the successful bidder shall furnish:

- A performance bond in the amount of 100 percent of the contract amount.

- Labor and materials payment bond in the sum equal to 100 percent of the contract amount.

At the time of project completion, the Owner may, in its sole discretion, permit the Contractor to substitute a maintenance bond in lieu of holding retainage for the entire guaranty period. If a bond is furnished it shall meet the following criteria:

- The bond shall be in an amount equal to 20 percent of the contract amount. Such bond shall guarantee the repair of all damage due to faulty materials or workmanship provided or done by the contractor. The guarantee shall remain in effect for a period of one year after the date of final acceptance of the job by the Owner.

Each bond shall be: (1) in a form satisfactory to the Owner; (2) with a surety company licensed and authorized to do business and with a resident agent designated for services of process in the State of New Hampshire; and (3) conditioned upon the faithful performance by the principal of the agreements contained in the original bid. All premiums for the contract bonds are to be paid by the contractor.

6. Execution and Approval of Contract

The successful bidder is required to present all contract bonds, to provide proof of insurance, and to execute the contract within 10 days following receipt of the City's notification of acceptance of the bid. No contract shall be considered as in effect until it has been fully executed by all parties.

7. Failure to Execute Contract

Failure to execute the contract and to provide acceptable bonds and proof of insurance within 10 days after notification of acceptance of bid shall be just cause for the cancellation of the award and the forfeiture of the proposal guarantee which shall become the property of the Owner, not as a penalty, but in liquidation of damages sustained. Award may then be made to the next lowest responsible bidder, or the City may exercise its reserved rights including the rejection of all bids or re-advertisement.

SECTION 2-A
PROPOSAL FORM

Portsmouth, New Hampshire
Department of Public Works

FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL Bid #37-17

CITY OF PORTSMOUTH, N.H.

To the City of Portsmouth, New Hampshire, herein called the Owner.

The undersigned, as Bidder, herein referred to as singular and masculine declares as follows:

1. All interested in the Bid as Principals are named herein.
2. This bid is not made jointly, or in conjunction, cooperation or collusion with any other person, firm, corporation, or other legal entity;
3. No officer, agent or employee of the Owner is directly or indirectly interested in this Bid.
4. The bidder has carefully examined the sites of the proposed work and fully informed and satisfied himself as to the conditions there existing, the character and requirements of the proposed work, the difficulties attendant upon its execution and the accuracy of all estimated quantities stated in this Bid, and the bidder has carefully read and examined the Drawings, Agreement, Specifications and other Contract Documents therein referred to and knows and understands the terms and provisions thereof;
5. The bidder understands that the submission of the bidder's proposal represents all required quantities of, scope of work required and means & methods necessary to complete the scope of work represented on the Drawings, indicated in the Specifications or other Contract Documents.. No additional penalty or increase in contract price toward the Owner will be justified for work reasonably inferred by the Contract Documents; and agrees that, if the Bid is accepted the bidder will contract with the Owner, as provided in the Contract Documents, this Bid Form being part of said Contract Documents, and that the bidder will supply or perform all labor, services, plant, machinery, apparatus, appliances, tools, supplies and all other activities required by the Contract Documents in the manner and within the time therein set forth, and that the bidder will take in full payment therefore the following item prices, to wit:

<u>DIVISION #</u>	<u>ITEM TOTAL IN FIGURES</u>
DIVISION 00 PROCUREMENT AND CONTRACTING REQUIREMENTS	\$ _____
DIVISION 01 GENERAL REQUIREMENTS	\$ _____
DIVISION 02 EXISTING CONDITIONS	\$ _____
DIVISION 03 CONCRETE	\$ _____
DIVISION 04 MASONRY	\$ _____
DIVISION 05 METALS	\$ _____
DIVISION 06 WOOD, PLASTICS AND COMPOSITES	\$ _____
DIVISION 07 THERMAL AND MOISTURE PROTECTION	\$ _____
DIVISION 08 OPENINGS	\$ _____
DIVISION 09 FINISHES	\$ _____
DIVISION 10 SPECIALTIES	\$ _____
DIVISION 12 FURNISHINGS	\$ _____
DIVISION 21 FIRE SUPPRESSION	\$ _____
DIVISION 22 PLUMBING	\$ _____
DIVISION 23 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)	\$ _____
DIVISION 26 ELECTRICAL	\$ _____
DIVISION 27 COMMUNICATIONS	\$ _____
DIVISION 28 ELECTRONIC SAFETY AND SECURITY	\$ _____
DIVISION 31 EARTHWORK	\$ _____
DIVISION 32 EXTERIOR IMPROVEMENTS	\$ _____
DIVISION 33 UTILITIES	\$ _____
TOTAL:	\$ _____

To Bidder:

The City reserves the right, after bid opening and prior to award of the contract, to modify the amount of the work in the event that bids exceed budgeted amounts and/or easements and agreements from one or more impacted property owners are not received.

It is the intention of this contract that the items listed above are inclusive of the entirety of the work as shown on the plans and as described in the specifications. All other items required to accomplish the above items are considered to be subsidiary work, unless shown as a pay item. This project will be bid by Lump Sum.

TOTAL FOR PROJECT AND BASIS OF AWARD

In Figures \$ _____

In Words \$ _____

ALLOWANCES:

ALLOWANCES:

2.01 INSPECTING AND TESTING ALLOWANCE	\$ _____
2.02 GRAPHICS	\$ _____

ADD ALTERNATES:

ALTERNATES:

ALTERNATE NO. 1:	
NO. 1A:	\$ _____
NO. 1B:	\$ _____
NO. 1C:	\$ _____
ALTERNATE NO. 2:	\$ _____
ALTERNATE NO. 3:	\$ _____
ALTERNATE NO. 4:	
NO. 4A (a):	\$ _____
NO. 4A (b):	\$ _____
NO. 4B (a):	\$ _____
NO. 4B (b):	\$ _____
NO. 4B (c):	\$ _____
NO. 4C (a):	\$ _____
NO. 4C (b):	\$ _____
NO. 4D (a):	\$ _____
ALTERNATE NO. 5:	\$ _____

The undersigned agrees that for extra work, if any, performed in accordance with the terms and provisions of the Contract Documents, the bidder will accept compensation as stipulated therein.

Date:

Company

By: _____
Signature

Business Address

Title: _____

City, State, Zip Code

Telephone: _____

The Bidder has received and acknowledged Addenda No. _____ through _____.

All Bids are to be submitted on this form and in a sealed envelope, plainly marked on the outside with the Bidder's name and address and the Project name as it appears at the top of the Proposal Form.

In order to follow the City's sustainability practices, future bid invitations/specifications may be sent electronically. Please provide an email address as to where I could email future bid invitations/specifications of this type. Thank you in advance for your cooperation.

Email

Address: _____

SECTION 2-B
BID SECURITY BOND

Portsmouth, New Hampshire
Department of Public Works

(This format provided for convenience, actual Bid Bond is acceptable in lieu of, if compatible.)

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned _____, as Principal, and _____, as Surety, are hereby held and firmly bound unto _____

IN THE SUM OF _____

as liquidated damages for payment of which, well and truly to be made we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

The condition of this obligation is such that whereas the Principal has submitted to the _____ A CERTAIN Bid attached hereto and hereby made a part hereof to enter into a contract in writing, hereinafter referred to as the "AGREEMENT" and or "CONTRACT", for

NOW THEREFORE,

(a) If said Bid shall be rejected or withdrawn as provided in the INFORMATION FOR BIDDERS attached hereto or, in the alternative,

(b) If said Bid shall be accepted and the Principal shall duly execute and deliver the form of AGREEMENT attached hereto and shall furnish the specified bonds for the faithful performance of the AGREEMENT and/or CONTRACT and for the payment for labor and materials furnished for the performance of the AGREEMENT and or CONTRACT, then this obligation shall be void , otherwise it shall remain in full force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder in no event shall exceed the amount of this obligation.

The Surety, for value received, hereby agrees that the obligation of said surety and its bond shall be in no way impaired or affected by any extensions of the time within such BID may be accepted, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the parties hereto have duly executed
this bond on the _____ day of _____, 20__.

(Name of Principal) L.S.

(SEAL)

BY _____

(Name of Surety)

BY _____

SECTION 2-C
STATEMENT OF BIDDER'S QUALIFICATIONS

Portsmouth, New Hampshire
Department of Public Works

Supply with Bid

All questions must be answered and the data given must be clear and comprehensive. This statement must be notarized. Add separate sheets if necessary

1. Name of Bidder
2. Permanent Main Office Address
3. Form of Entity
4. When Organized
5. Where Organized
6. How many years have you been engaged in the contracting business under your present name; also state names and dates of previous firm names, if any.
7. Contracts on hand; (schedule these, showing gross amount of each contract and the approximate anticipated dates of completion).
8. General character of work performed by your company.
9. Have you ever failed to complete any work awarded to you? ____ (no) ____ (yes). If so, where and why?
10. Have you ever defaulted on a contract?
____ (no) ____ (yes). If so, where and why?
11. Have you ever failed to complete a project in the time allotment according to the Contract Documents?
____ (no) ____ (yes). If so, where and why?
12. List the most important contracts recently executed by your company, stating approximate cost for each, and the month and year completed.
13. List your major equipment available for this contract.
14. List your key personnel such as project superintendent and foremen available for this contract.
15. List subcontractors for the following categories whom you will use for the following (unless this work is to be done by your own organization, in which case please state).
 - a. Paving _____

- b. Concrete Flatwork _____
- c. Masonry _____
- d. Structural Steel _____
- e. Roofing _____
- f. Windows/Curtainwalls _____
- g. Plumbing _____
- h. Electrical _____
- i. Excavation _____

The City reserves the right to disallow any subcontractor including work proposed to be completed by the General Contractor.

16. With what banks do you do business?

a. Do you grant the Owner permission to contact this/these institutions?
____(yes) ____ (no).

b. Latest Financial Statements, certified audited if available, prepared by an independent certified public accountant, may be requested by Owner. If requested, such statements must be provided within five (5) business days or the bid proposal will be rejected. Certified Audited Statements are preferred. Internal statements may be attached only if independent statements were not prepared.

Dated at _____ this _____ day of _____, 20__.

Name of Bidder

BY _____

TITLE _____

State of _____

County of _____

_____ being duly sworn, deposes and

says that the bidder is _____ of _____
(Name of Organization)

and answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to before me this _____ day of _____, 20__.

Notary of Public
My Commission expires _____

SECTION 2-D
NOTICE OF INTENT TO AWARD

Portsmouth, New Hampshire
Department of Public Works

Date:

TO:

IN AS MUCH as you were the low responsible bidder for work entitled:

FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL Bid #37-17

You are hereby notified that the City intends to award the aforesaid project to you.

Immediately take the necessary steps to execute the Contract and to provide required bonds and proof of insurance within ten (10) calendar days from the date of this Notice.

The City reserves the right to revoke this Notice if you fail to take the necessary steps to execute this Contract.

City of Portsmouth
Portsmouth, New Hampshire

Judie Belanger,
Finance Director

SECTION 2-E
NOTICE TO PROCEED

Portsmouth, New Hampshire
Department of Public Works

DATE:

FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL Bid #37-17

TO:

YOU ARE HEREBY NOTIFIED TO COMMENCE WORK IN ACCORDANCE
WITH THE AGREEMENT DATED _____ AND ALL
WORK SHALL BE COMPLETED BY _____.

CITY OF PORTSMOUTH, N.H.

BY: Peter H. Rice, PE

TITLE: Public Works Director

ACCEPTANCE OF NOTICE

RECEIPT OF THE ABOVE NOTICE TO
PROCEED IS HEREBY ACKNOWLEDGED BY

This the _____ day of _____ 20__

By: _____

Title: _____

SECTION 2-F
CHANGE ORDER

Portsmouth, New Hampshire
Department of Public Works

CHANGE ORDER

Change Order Number

Date of Issuance

Owner: CITY OF PORTSMOUTH, N.H

Contractor:

You are directed to make the following changes in the Contract Documents:

Description:

Purpose of Change Order:

Attachments:

CHANGE IN CONTRACT PRICE

CHANGE IN CONTRACT TIME

Original Contract Price:
\$

Original Completion Date:
June 1, 2018

Contract Price prior to this
Change Order:
\$

Contract date prior to this
Change Order:

Net Increase or Decrease of
this Change Order:
\$

Net Increase or Decrease of
this Change Order:

Contract Price with all
approved Change Orders:
\$

Contract Due date with all
approved Change Orders:

RECOMMENDED:

APPROVED:

APPROVED:

by _____

by _____

by _____

by _____

PW Director

City Finance

City Manager

Contractor

SECTION 2-G
PERFORMANCE BOND

Portsmouth, New Hampshire
Department of Public Works

(This format provided for convenience, actual Performance
Bond is acceptable in lieu, if compatible)

Bond Number _____

KNOW ALL MEN BY THESE PRESENTS

that _____ as Principal, hereinafter called Contractor,
and _____ (Surety Company) a corporation organized and existing under the laws
of the State of _____ and authorized to do business in the State of New Hampshire as surety,
hereinafter called Surety, are held and firmly bound unto the City of Portsmouth, N.H. Obligee, hereinafter called
Owner, in the amount of _____ Dollars (\$ _____), for the payment whereof Contractor
and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally,
firmly by these presents. WHEREAS, Contractor has by written agreement dated _____ entered
into a contract with Owner for _____ in accordance with drawings and specifications prepared by
the Public Works Department, 680 Peverly Hill Road, Portsmouth, N.H. 03801, which contract is by reference made
a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if the Contractor shall well and
faithfully do and perform the things agreed by him to be done and performed, according to the terms of said
Contract and such alterations as may be made in said Contract during progress work, and shall further indemnify and
save harmless the said Owner in accordance with the Contract and shall remedy without cost to the Owner any
defect which may develop within one year from the time of completion and acceptance of the work.

The Surety hereby waives notice of any alteration in work or extension of time made by the Owner or any of its
agents or representatives.

Whenever Contractor shall be, and declared by Owner to be, in default under the Contract, the Owner having
performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

- (1) Complete the Contract in accordance with its terms and conditions, or

SECTION 2-H
LABOR AND MATERIAL PAYMENT BOND

Portsmouth, New Hampshire
Department of Public Works

(This format provided for convenience, actual Labor and Material Bond is acceptable in lieu, if compatible)

Bond Number _____

KNOW ALL MEN BY THESE PRESENTS:

that _____

as Principal, hereinafter called Contractor, and _____ (Surety Company) a corporation organized and existing under the laws of the State of

_____ and authorized to do business in the State of New Hampshire hereinafter called Surety, are held and firmly bound unto the City of Portsmouth, N.H. Oblige, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the

amount of _____ Dollars (\$ _____), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated _____ entered into a

contract with Owner for _____ in accordance with drawings and specifications prepared by the Public Works Department, 680 Peverly Hill Road, Portsmouth, N.H. 03801, which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that the Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract and for the hire of all equipment, tools, and all other things contracted for or used in connection therewith, then this obligation shall be void, otherwise it shall remain in full force and effect, subject however, to the following conditions:

(1) A claimant is defined as one having a direct contract with the Principal or, with a subcontractor of the Principal for labor, material, equipment, or other things used or reasonably required for use in the performance of the Contract. "Labor and material" shall include but not be limited to that part of water, gas, power, light, heat, oil and gasoline, telephone service or rental of equipment applicable to the Contract.

(2) The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such a claimant, may sue on this bond for the use of such claimant, prosecute the suit by final judgment for such sum or sums as may be

LABOR AND MATERIAL PAYMENT BOND (continued)

justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any such suit or any costs or expenses of any such suit, and principal and surety shall jointly and severally indemnify, defend and hold the Owner harmless for any such suit, costs or expenses.

(3) No suit or action shall be commenced hereunder by any claimant:

(a) Unless Claimant, other than one having a direct contract with the Principal, shall have given notice to all the following:

The Principal, the Owner and the Surety above named, within six (6) calendar months after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, Owner, and Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of New Hampshire save that such service need not be made by a public officer.

(b) After the expiration of one (1) year following the date on which Principal ceased all work on said contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof, such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

(c) Other than in a State court of competent jurisdiction in and for the county or other political subdivision of the State in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere. (4) The amount of this bond may be reduced by and to the extent of any payment of payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed on record against said improvement, whether or not claim for the amount of such lien by presented under and against this bond.

Signed and sealed this _____ day of _____, 20____. In the presence of:

(Witness) BY: _____
(Principal) (Seal)

(Surety Company)

(Witness) BY: _____
(Title) (Seal)

LABOR AND MATERIAL PAYMENT BOND (continued)

Note:

If the Principal (Contractor) is a partnership, the Bond should be signed by each of the partners.

If the Principal (Contractor) is a corporation, the Bond should be signed in its correct corporate name by its duly authorized Officer or Officers.

If this bond is signed on behalf of the Surety by an attorney-in-fact, there should be attached to it a duly certified copy of his Power of Attorney showing his authority to sign such Bonds.

There should be executed an appropriate number of counterparts of the bond corresponding to the number of counterparts of the Agreement.

SECTION 2-I
MAINTENANCE BOND

Portsmouth, New Hampshire
Department of Public Works

At the Owner's election, a maintenance bond may be substituted for retainage at the completion of the project. If the Owner permits a maintenance bond, it shall be in the amount of **Twenty Percent (20%)** of the contract price with a corporate surety approved by the Owner. Such bond shall be provided at the time of Contract completion and shall guarantee the repair of all damage due to faulty materials or workmanship provided or done by the Contractor. This guarantee shall remain in effect for a period of one year after the date of final acceptance of the job by the Owner.

SECTION 2-J
CONTRACTOR'S AFFIDAVIT

Portsmouth, New Hampshire
Department of Public Works

STATE OF _____ :

COUNTY OF _____ :

Before me, the undersigned, a _____
(Notary Public, Justice of the Peace)

in and for said County and State personally appeared, _____
(Individual, Partner, or duly authorized representative of Corporate)

who, being duly sworn, according to law deposes and says that the cost of labor, material, and equipment and outstanding claims and indebtedness of whatever nature arising out of the performance of the Contract between

CITY OF PORTSMOUTH, NEW HAMPSHIRE

and _____
(Contractor)

of _____

Dated: _____

has been paid in full for Construction of: **FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL**

(Individual, Partner, or
duly authorized
representative of
Corporate Contractor)

Sworn to and subscribed
before me this _____ day
of _____ 20____

SECTION 2-K
CONTRACTOR'S RELEASE

Portsmouth, New Hampshire
Department of Public Works

KNOW ALL MEN BY THESE PRESENTS that _____

(Contractor) of _____, County of _____ and State of _____

_____ does hereby acknowledge

that _____ (Contractor)

has on this day had, and received from the CITY OF PORTSMOUTH NEW HAMPSHIRE, final and completed payment for the Construction of:

Bid #37-17 FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL

NOW THEREFORE, the said _____

(Contractor)

for myself, my heirs, executors, and administrators) (for itself, its successors and assigns) do/does by these presents remise, release, quit-claim and forever discharge the City of Portsmouth, New Hampshire, its successors and assigns, of and from all claims and demands arising from or in connection with the said Contract dated _____, and of and from all, and all manners of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specifications, covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in law of equity, or otherwise, against the City of Portsmouth, New Hampshire, its successors and assigns, which (I, my heirs, executors, or administrators) (it, its successors and assigns) ever had, now have or which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the beginning of record time to the date of these presents.

IN WITNESS WHEREOF,

Contractor:

By: _____

print name of witness: _____

Its Duly Authorized _____

Dated: _____

SECTION 2-L
SPECIAL CONDITIONS

Portsmouth, New Hampshire
Department of Public Works

1. The Work will be executed in/on an occupied building and site that serves the public daily, 24 hours a day and 365 days a year. The Contractor will be required to perform the work with minimal disruption from noise, dust and fumes as possible.
2. A construction plan will be provided to the Owner for approval indicating the Contractor's phasing plan to allow occupants to conduct business.
3. The Contractor will present an overall Work Phasing Schedule further detailed bi-weekly with a detailed two week look ahead plan of work and communicate it to the Owner's Representative. Update schedules as required and submit, minimally, to the Owner and Architect at the bi-weekly job meeting. All work will require coordination accordingly.

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

SUMMARY

1.01 DOCUMENT INCLUDES

- A. General
 - 1. Intent
- B. Invitation
 - 1. Intent
 - 2. Contract Time
- C. Bid Documents and Contract Documents
 - 1. Definitions
 - 2. Sub-Bidder's Representation
 - 3. Contract Documents Identification
 - 4. Availability
 - 5. Examination
 - 6. Inquiries & Addenda
 - 7. Substitutions
- D. Site Assessment
 - 1. Site Examination
 - 2. Prebid Conference
- E. Qualifications
 - 1. Prequalification
 - 2. Subcontractors
- F. Bid Submission
 - 1. Submission Procedure
- G. Performance Assurance
 - 1. Consent of Surety
 - 2. Bonds and Insurance
 - 3. Miscellaneous Regulations
 - 4. Selection and Award of Alternates
- H. Offer Acceptance/Rejection

INVITATION

2.01 INTENT

- A. Instructions to Bidders are provided for the general information and use of the General Contractor who shall make all Bidders aware of the terms and conditions described herein.
- B. Where the term Bidders is used, it shall be understood to mean those persons or organizations, including the General Contractor's own forces where applicable, who submit prices to the General Contractor for Work described in the Contract Documents.

2.02 CONTRACT TIME

- A. Perform the Work within the time stated in Section 01 00 00 - General Requirements.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.01 DEFINITIONS

- A. Definitions set forth in the General Conditions of the Contract for Construction, AIA Document A201, or in other Contract Documents are applicable to the Bidding Documents.

- B. Addenda are written or graphic instruments, issued by the Architect prior to the execution of the Contract. They modify or interpret the Bidding Documents by additions, deletions, clarifications, or corrections. It shall be the Construction Manager's responsibility to distribute Addenda to the various Bidders. Addenda will become part of the Contract Documents when the Construction Contract is executed.
- C. Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or deducted for sums stated in Alternate Bids.
- D. Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in Work, as described in the Bidding Documents, is accepted.
- E. Unit Price is an amount stated in the Bid as a possible price per unit of measurement for materials, equipment, services or a portion of the Work as described in Bidding Document. The choice of using Unit Prices, or an alternative method of payment, for additional Work shall be left solely to the Owner's discretion.
- F. Bidder is a person or entity who submits a Bid to the Contractor for materials, equipment or labor for a portion of the Work.

3.02 BIDDER'S REPRESENTATION

- A. Each Bidder by making his Bid represents that he has read and understands the Bidding Documents, that he agrees that the Bidding Documents are adequate to produce the required results, and that his Bid is in accordance therewith.
- B. Each Bidder by making his Bid represents that he has visited and thoroughly inspected the existing building, and familiarized himself with the local conditions under which the Work will be performed. Bidders are encouraged to make any and all inspections and tests as they feel necessary to achieve such familiarization prior to submitting Bids. Such inspections and tests shall be conducted at times mutually acceptable to the Owner, General Contractor, and Bidder. Unless waived by the Architect, Bidders shall make repairs following their testing, as necessary to restore tested areas to pre-testing condition. Should a Bidder conclude that time or other factor(s) prohibits him from performing sufficient tests, he shall so notify the Architect, in writing, prior to submitting his Bid to the General Contractor.
- C. The submission of a Bid will be construed as conclusive evidence that the Bidder has made all such examinations and inspections necessary for a complete and proper assessment of the Work required, and that the Bidder has included in his Bid a sum sufficient to cover the cost of all items necessary to perform the Work as set forth in the proposed Contract Documents. No allowance will be made to a Bidder because of lack of such examination, inspection or knowledge.
- D. Each Bidder by making his Bid represents that he has assessed the conditions of the current construction marketplace, and verified that an adequate, experienced workforce is available to suitably man the Work of this Project, and complete it in a timely fashion.
- E. Each Sub-Bidder is assumed to have made himself familiar with all Federal, State and Local laws, ordinances and regulations which in any manner affect those engaged in or upon the Work, or in any way affect those engaged or employed in the Work of the materials or equipment used in or upon the Work, or in any way affect the conduct of the Work. All taxes and assessments as levied by Federal, State and Local laws shall be applicable to this Contract.

3.03 AVAILABILITY

- A. Bid documents may be obtained at the City of Portsmouth website:
<http://www.cityofportsmouth.com/finance/purchasing.htm>.
 - 1. Electronic copies of the plans and specifications may be obtained through the website. Hard copy documents are not available for pickup or delivery.

- B. Bid Documents are made available only for the purpose of obtaining offers for this Project. Their use does not grant a license for other purposes.

3.04 EXAMINATION

- A. Each Bidder shall examine the Bidding Documents carefully.
- B. Bidders are encouraged to direct any questions which may arise to the Architect, through the General Contractor, in order to provide necessary clarifications prior to the commencement of the Work.
- C. Bid Documents may be viewed at the City of Portsmouth website: <http://www.cityofportsmouth.com/finance/purchasing.htm>.
- D. Upon receipt of electronic Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.
- E. Immediately notify Architect through the General Contractor, upon finding ambiguity, discrepancies or omissions in the Bid Documents, or the site and local conditions. Should Sub-Bidders fail to notify the Architect through the General Contractor, of discrepancies or contradictions in the Bidding Documents, they shall be assumed to have Sub-Bid the more expensive alternative.

3.05 INQUIRIES & ADDENDA

- A. Requests for interpretation or correction of any ambiguity, inconsistency or error, which a Bidder may discover therein, shall be submitted to the Architect, through the General Contractor, in writing.
- B. Any interpretation or correction will be issued in electronic format and posted on-line at the Purchasing site, City of Portsmouth, (<http://www.cityofportsmouth.com/finance/purchasing.htm>) as an Addendum by the Architect. No Bidder shall rely upon any interpretation or correction given by any other method.
 - 1. Addenda will **NOT** be sent directly to proposers.
- C. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.
- D. Verbal answers are not binding on any party.

3.06 SUBSTITUTIONS

- A. Each Bidder represents that his Bid is based upon the materials and equipment described in the Bidding Documents. Where the language "or approved equal" is used in the Bidding Documents, it is intended to require that all such materials and equipment shall be submitted as required by these Instructions to Bidders, and approved by the Architect prior to the receipt of Bids. See Section 01 06 00 - Product Requirements, for additional information and the required Contractor's Substitution Request form.
- B. Each request for substitution shall be submitted on the "Substitution Request" form and include a complete description of the proposed substitute, the name of the material or equipment for which it is to be substituted, drawings, cuts, performance and test data, lists of similar successfully completed installations and references, and any other data or information necessary for a complete evaluation. A statement identifying changes in other material, equipment or other portions of the Work that incorporation of the proposed substitution would require shall also be included.
- C. If a Bidder proposes to use a material that while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, he shall inform the Architect through the General Contractor, in writing of the nature of such deviations at the time the material is submitted for review. It shall be the responsibility of the Bidder to notify the Architect through the General Contractor, in writing, of the presence of asbestos or any other hazardous materials in any proposed substitution. Such written notice shall be in the form of a cover letter attached to the related documents.

- D. In requesting approval of deviations or substitutions, a Bidder shall provide evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality of result at least equal to that otherwise attainable. If, in the opinion of the Architect, the evidence presented does not provide a sufficient basis for such certainty, the Architect may reject such substitution or deviation without further investigation.
- E. In requesting approval of substitutions, a Bidder represents that he will provide the same warranty for the substitution that he would for that specified.
- F. The Contract Documents are intended to produce a building and site improvements of consistent character and quality of design. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutions which, in his opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project.
- G. The General Contractor shall be solely responsible for coordinating the installation of accepted substitutions, making such changes as may be required for the Work to be complete in all respects. Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the General Contractor, notwithstanding approval or acceptance of such substitution by the Owner or the Architect, unless such substitution was made at the written request or direction of the Owner or the Architect.
- H. The burden of proof of the merit of a proposed substitution is upon the proposer. Approval of a proposed substitution is valid only upon issuance by the Architect in written form and the Architect's decision of approval or disapproval of a proposed substitution shall be considered final.
- I. Where the Bid Documents stipulate a particular product, substitutions shall be considered up to 7 days before receipt of Bids.
- J. When a request to substitute a product is made, the Architect may, or may not approve the substitution and will issue an Addendum to be posted on-line at the Purchasing site, City of Portsmouth, (<http://www.cityofportsmouth.com/finance/purchasing.htm>).

SITE ASSESSMENT

4.01 PREBID CONFERENCE AND SITE EXAMINATION

- A. Examine the Project site before submitting a bid. A pre-bid conference at the Project site will be arranged by the Owner. All General Contractors are **REQUIRED** to attend the pre-bid conference.
 - 1. Failure by the General Contractor to attend the pre-bid conference may, per sole discretion of the Owner, disqualify said General Contractor from submitting a bid.
- B. All subcontract bidders and suppliers and suppliers are invited.
- C. Representatives of Architect will be in attendance.
- D. Information relevant to the Bid Documents will be recorded in an Addendum and electronically posted on-line at the Purchasing site, City of Portsmouth, (<http://www.cityofportsmouth.com/finance/purchasing.htm>).

QUALIFICATIONS

5.01 PREQUALIFICATION

- A. The Prequalified General Contractors for the Project are:
 - 1. Berkeley Builders Co., North Andover, MA
 - 2. Careno Construction Co, Portsmouth, NH
 - 3. Consigli Construction Co, Boston, MA

4. Harvey Construction, Bedford, NH
5. Martini Northern, Portsmouth, NH
6. Structure Tone Construction, Boston, MA
7. Turnstone Corporation, Milford, NH

5.02 BIDDERS

- A. Each prospective Bidder shall, if requested by the Owner and Architect, submit a properly executed Qualification Statement on forms prescribed or approved by the Architect. Such forms shall be completed in every detail. Upon determination of the qualifications submitted, the Owner reserves the right to accept or reject a prospective Bidder. Failure to fully execute a Qualification Statement, when required, will cause the prospective Bidder to be rejected.
- B. The General Contractor shall submit the names of all proposed Bidders to the Owner and Architect prior to the solicitation of Bids. Submitting such a list of Bidders shall not in any way relieve the Contractor of his responsibility for their reliability and performance.
- C. The General Contractor shall be required to establish to the satisfaction of the Owner and the Architect the reliability and responsibility of the proposed Bidders to furnish and perform the Work pertaining to such proposed Bidders' respective trades.
- D. The Owner, after due consideration will then inform the General Contractor if he has reasonable and substantial objection to any proposed Bidder. If the Owner has a reasonable and substantial objection to any such Bidder, and refuses to accept such person or organization, the General Contractor shall submit an acceptable substitute Bidder.
- E. Bidders and other persons and organizations proposed by the General Contractor and accepted by the Owner must be used on the Work for which they were proposed and accepted, and shall not be changed except with the written approval of the Owner.

BID SUBMISSION

6.01 SUBMISSION PROCEDURES

- A. Bidders shall be solely responsible for the delivery of their Bids in the manner and time prescribed.
- B. It is the intent of this Contract that as much of the Work as practical be competitively Bid by not less than three (3) pre-qualified Bidders for each trade or Bid package.
- C. It is the General Contractor's responsibility to organize the Bid packages in such a manner so as to optimize the ease of execution of the Work and obtain most favorable pricing for the Owner.
- D. Delivery of Bids: See Section 1-A Invitation to Bid and Section 1-B Instructions to Bidders included in these Specifications.
- E. The Bidder acknowledges the right of the Owner to reject any or all Bids and to waive any informality or irregularity in any Bid received, or to accept any Bid. In addition, the Bidder recognizes the right of the Owner to reject a Bid if the Bidder failed to submit the data required by the Bidding Documents, or if the Bid is in any way incomplete or irregular.

6.02 BID INELIGIBILITY

- A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Owner, be declared unacceptable.

PERFORMANCE ASSURANCE

7.01 CONSENT OF SURETY

- A. Submit with the Bid: Consent of Surety form stating the corporation, partnership, or individual, other than the Contractor who are to be holden and to stand firmly bound and obligated unto

the City of Portsmouth (the Owner), its successors and assigns, in the sum of the applicable contract.

7.02 BONDS

- A. Prior to the execution of the Contract, the selected General Contractor shall furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder. Such bonds shall be in the amount of One Hundred Percent (100%) of the Contract sum, and shall be on forms as bound in the Bidding Documents, or as approved by the Owner. The premium shall be paid by the General Contractor, and the securities secured through the General Contractor's usual sources as may be agreeable to the parties. The General Contractor shall deliver the required bonds to the Owner not later than the date of execution of the Contract, or if the Work is commenced prior thereto in response to a Letter of Intent, the Contractor shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be issued. Bonds shall remain in effect for not less than the entire guarantee period.
- B. The General Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power.

7.03 INSURANCE

- A. Prior to the start of the Work, the General Contractor shall furnish insurance certificates to the Owner and Architect as required in Section 00 72 00 - General Conditions.

7.04 MISCELLANEOUS REGULATIONS

- A. Attention is called to applicable Equal Employment Opportunity Provisions, Affirmative Action regulations and all requirements placed upon the Contractor thereunder.

7.05 SELECTION AND AWARD OF ALTERNATES

- A. Indicate variation of Bid price for Alternates listed on the Bid Form. Unless otherwise indicated, indicate Alternates as a difference in Bid price by adding to or deducting from the Base Bid price.
- B. Bids will be evaluated on the Base Bid price, plus consideration of Alternates and Bid Price adjustments, as determined by the Owner to be in his/her best interests.

OFFER ACCEPTANCE/REJECTION

8.01 DURATION OF OFFER

- A. Bids shall remain open to acceptance and shall be irrevocable for a period of thirty (30) days after the Bid closing date.

8.02 ACCEPTANCE OF OFFER

- A. Owner reserves the right to accept or reject any or all offers.

END OF INSTRUCTIONS TO BIDDERS

SECTION 00 50 00
CONTRACTING FORMS AND SUPPLEMENTS

GENERAL

1.01 STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR APPLICABLE TO THIS CONTRACT

- A. AIA Document A101 – Standard Form of Agreement Between Owner and Contractor, 2007 Edition Amended, attached, is the Standard Form of Agreement Between Owner and Contractor.

END OF SECTION

 **AIA**[®] Document A101[™] – 2007

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

AGREEMENT made as of the TO BE DETERMINED day of TO BE DETERMINED in the year 2017
(In words, indicate day, month and year.)

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

City of Portsmouth, Portsmouth City Hall
1 Junkins Avenue
Portsmouth, New Hampshire 03801
John P. Bohenko, City Manager

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

TO BE DETERMINED

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

Template Files (Edited 2013)
Bid # 37-17
Façade Replacement & Addition – Portsmouth City Hall
Portsmouth, New Hampshire 03801

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

Lavallee Brensinger Architects
155 Dow Street, Suite 400
Manchester, New Hampshire 03101

The Owner and Contractor agree as follows.

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

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

AIA Document A201[™]–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

TABLE OF ARTICLES

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

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

Refer to the modified AIA Document A201 – 1997 included within these Specifications

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner’s time requirement shall be as follows:

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

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than Three hundred and sixty five (365) days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

Portion of Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

Refer to the modified AIA Document A201 – 1997 included within these Specifications

ARTICLE 4 CONTRACT SUM

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

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

ALTERNATES:

- ALTERNATE NO. 1:
 - NO. 1A: \$
 - NO. 1B: \$
 - NO. 1C: \$
- ALTERNATE NO. 2: \$
- ALTERNATE NO. 3: \$
- ALTERNATE NO. 4:
 - NO. 4A (a): \$
 - NO. 4A (b): \$
 - NO. 4B (a): \$
 - NO. 4B (b): \$
 - NO. 4B (c): \$
 - NO. 4C (a): \$
 - NO. 4C (b): \$
 - NO. 4D (a): \$

(Paragraph Deleted)

- ALTERNATE NO. 5: \$

(Paragraph Deleted)

(Table Deleted)

§ 4.3 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

(Table Deleted)

ALLOWANCES:

2.01 INSPECTING AND TESTING ALLOWANCE \$

2.02 GRAPHICS \$

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

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

Documents per the provisions indicated within the modified AIA Document A201 – 1997 included as a portion of these Specifications

Refer to the
modified AIA Document A201 – 1997 included within these Specifications

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

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

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

Refer to the modified AIA Document A201 – 1997 included within these Specifications

(Paragraphs Deleted)

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

§ 5.2 FINAL PAYMENT

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

per the provisions indicated within the modified AIA Document
A201 – 1997 included as a portion of these Specifications

(Paragraph Deleted)

Refer to the modified AIA Document A201 – 1997 included within these Specifications

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

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

The Owner (City of Portsmouth) shall be the Final Decision Maker. Refer to the modified AIA Document A201 – 1997 included within these Specifications.

§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

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

Litigation in a court of competent jurisdiction

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

(Paragraphs Deleted)

§ 8.2 The Owner's representative:
(Name, address and other information)

City of Portsmouth, Portsmouth City Hall
1 Junkins Avenue
Portsmouth, New Hampshire 03801
John P Bohenko, City Manager
(The City Manager is required to approve any Change Orders)
Owner Site Representatives:
Dan J. Hartrey, Project Manager
Ryan A. Flynn, Project Manager

Init.

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(3B9ADA30)

§ 8.3 The Contractor's representative:
(Name, address and other information)

TO BE DETERMINED

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

(Paragraph Deleted)

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor as modified here-in.

§ 9.1.2 The General Conditions are AIA Document A201-2007, General Conditions of the Contract for Construction as modified.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
§ 9.1.4	The Specifications: (Either list the Specifications here or refer to an exhibit attached to this Agreement.)		
	Bid # 37-17		
	Façade Replacement & Addition – Portsmouth City Hall		
	Portsmouth, New Hampshire		
	Construction Documents – For Permit Only		
	Project 16-042-00		
	17 February 2017		

DIVISION 01 -- GENERAL REQUIREMENTS

- 01 00 00 - General Requirements
- Section 1-A Invitation to Bid
- Section 1-B Instruction to Bidders
- Section 1-C Award and Execution of Contract
- Section 2-A Proposal Form
- Section 2-B Bid Security Bond
- Section 2-C Statement of Bidders Qualifications
- Section 2-D Notice of Intent to Award
- Section 2-E Notice to Proceed
- Section 2-F Change Order
- Section 2-G Performance Bond
- Section 2-H Labor and Material Payment Bond
- Section 2-I Maintenance Bond

Section 2-J Contractors Affidavit
Section 2-K Contractors Release
Section 2-L Special Conditions
00 21 13 – Instruction to Sub-Bidders
00 05 00 – Contracting Forms and Supplements
 AIA Document A101 – 2007 Amended
00 72 00 – General Conditions
 AIA Document A201 – 2007 Amended
01 00 00 – General Requirements
01 00 30 - Electronic Media
01 21 00 - Allowances
01 23 00 - Alternates
01 30 00 - Administrative Requirements
01 40 00 - Quality Requirements
01 45 33 - Code-Required Special Inspections
 Statement of Special Inspections
01 50 00 - Temporary Facilities
01 57 21 - Indoor Air Quality Controls
01 60 00 - Product Requirements
 Contractor's Substitution Form
01 71 00 - Cutting and Patching
01 74 19 - Construction Waste Management
01 78 00 - Project Closeout
01 78 10 - Warranties

DIVISION 02 -- EXISTING CONDITIONS

02 32 10 – Subsurface Explorations
02 41 00 - Demolition

DIVISION 03 -- CONCRETE

03 30 00 – Concrete
03 54 00 – Cast Underlayment

DIVISION 04 -- MASONRY

04 20 00 – Unit Masonry

DIVISION 05 -- METALS

05 12 00 – Structural Steel
05 30 00 – Metal Decking
05 40 00 – Cold Formed Metal Framing
05 50 00- Metal Fabrications

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES

06 10 54 – Wood Blocking and Curbing
06 20 00 – Finish Carpentry

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION

07 11 13 – Bituminous Dampproofing
07 21 00 – Thermal Insulation
 Manufacturer Wall Assembly Summary
07 21 19 – Foamed-In-Place Insulation
07 24 00 – Exterior Insulation and Finish Systems
07 25 00 – Weather Barriers
07 42 13 – Metal Wall Panels
07 55 00 - Modified Bituminous Membrane Roofing
07 62 00 – Sheet Metal Flashing and Trim
07 84 00 – Firestopping

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07 90 05 – Joint Sealants
07 95 13 – Expansion Joint Cover Assemblies

DIVISION 08 -- OPENINGS

08 11 13 – Hollow Metal Doors and Frames
08 14 16 – Flush Wood Doors
08 31 00 – Access Doors and Panels
08 44 13 – Glazed Aluminum Curtain Walls
08 71 00 – Door Hardware
08 80 00 – Glazing
08 91 00 – Louvers

DIVISION 09 -- FINISHES

09 05 61 – Common Work Results for Flooring Preparation
09 21 16 – Gypsum Board Assemblies
09 30 00 – Tiling
09 51 00 – Acoustical Ceilings
09 65 00 – Resilient Flooring
09 90 00 – Painting

DIVISION 10 -- SPECIALTIES

10 14 24 – Interior Signage

DIVISION 11 -- EQUIPMENT (NOT USED)

DIVISION 12 -- FURNISHINGS

12 48 13 – Entrance Floor Mats

DIVISION 13 -- SPECIAL CONSTRUCTION (NOT USED)

DIVISION 14 -- CONVEYING EQUIPMENT (NOT USED)

DIVISION 21 -- FIRE SUPPRESSION

See Drawings

DIVISION 22 -- PLUMBING

See Drawings

DIVISION 23 -- HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

See Drawings

DIVISION 26 -- ELECTRICAL

See Drawings

DIVISION 27 -- COMMUNICATIONS

See Drawings

DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY (NOT USED)

DIVISION 31 -- EARTHWORK

31 23 15 – Building Pad Earthwork
See Drawings for additional specification requirements.

DIVISION 32 -- EXTERIOR IMPROVEMENTS

See Drawings

DIVISION 33 -- UTILITIES

See Drawings

APPENDIX A

Geotechnical Report: GEOTECHNICAL INVESTIGATION REPORT, PROPOSED PORTSMOUTH POLICE STATION ADDITION, 1 JUNKINS DRIVE, PORTSMOUTH, NEW HAMPSHIRE; Authored by: John Turner Consulting Inc, Dover New Hampshire; Dated: March 10, 2017

(Table Deleted)

§ 9.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

FAÇADE REPLACEMENT & ADDITION – PORTSMOUTH CITY HALL
CONSTRUCTION DOCUMENTS – FOR PERMIT ONLY
FEBRUARY 17, 2017

C-101 EXISTING CONDITIONS / DEMOLITION PLAN
C-102 SITE PLAN
C-501 DETAIL SHEET

AD1.0 BASEMENT LEVEL DEMOLITION PLAN
AD1.1 LEVEL 1 DEMOLITION PLAN
AD1.2 LEVEL 2 DEMOLITION PLAN
AD1.3 LEVEL 3 DEMOLITION PLAN
AD1.4 LEVEL 4 DEMOLITION PLAN
AD1.5 LEVEL – ROOF DEMOLITION PLAN
AD2.1 EXTERIOR ELEVATIONS – DEMOLITION
AD2.2 EXTERIOR ELEVATIONS – DEMOLITION

A0.1 LEGENDS, SYMBOLS, NOTES, PARTITION TYPES
A0.3 CURTAINWALL, DOOR AND FRAME TYPES & DETAILS
A0.4 CURTAINWALL AND FRAME TYPES
A1.0 BASEMENT PLAN
A1.1 LEVEL 1 PLAN
A1.2 LEVEL 2 PLAN
A1.3 LEVEL 3 PLAN
A1.4 LEVEL 4 PLAN
A1.5 LEVEL – ROOF PLAN
A2.1 EXTERIOR ELEVATIONS
A2.2 EXTERIOR ELEVATIONS
A2.4 BUILDING SECTIONS
A3.1 WALL SECTIONS
A3.2 WALL SECTIONS & DETAILS
A3.3 WALL SECTIONS & DETAILS
A3.4 WALL SECTIONS
A3.5 WALL SECTIONS & DETAILS
A3.6 WALL SECTIONS & DETAILS
A3.7 WALL SECTION DETAILS
A4.1 ENLARGED PLANS – PD LOBBY
A5.1 PLAN DETAILS

AI1.0 GENERAL NOTES, LEGENDS, ROOM FINISH SCHEDULES, PD ENTRANCE FLOOR PLAN – FINISHES

S1.0 GENERAL NOTES
S1.1 FOUNDATION & ROOF FRAMING PLAN P.D. LOBBY

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- S1.2 EXTERIOR ELEVATIONS
- S1.3 EXTERIOR ELEVATIONS
- S3.1 FRAMING SECTIONS & DETAILS
- S3.2 FRAMING SECTIONS & DETAILS

- M-101 HVAC ELEVATIONS
- M-201 ENLARGED PD ENTRANCE HVAC PLANS

- E-100 ELECTRICAL SPECIFICATIONS & SCHEDULES
- E-101 ELECTRICAL ELEVATIONS
- E-201 ENLARGED PD ENTRANCE ELECTRICAL REMOVALS, LIGHTING, POWER AND SYSTEMS PLANS

(Table Deleted)

§ 9.1.6 The Addenda, if any:

Number	Date	Pages
--------	------	-------

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

(Paragraphs Deleted)

(Paragraphs Deleted)

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201-2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201-2007.)

Contractor's General Liability under shall include completed operations and product liability coverage's and eliminate the exclusion with respect to property under the care, custody, and control of Contractor or provide equivalent coverage under Builders Risk:

(Table Deleted)

- a. General Aggregate including per project aggregate endorsement:
(Except Products-Completed Operations): \$ 2,000,000
- b. Products-Completed
Operations Aggregate: \$ 2,000,000
- c. Each Occurrence
(Bodily Injury and Property Damage): \$ 2,000,000

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Property Damage liability insurance including, Collapse and Underground coverages. If blasting is to be used, also include explosion coverage. \$1,000,000

The City of Portsmouth shall be named as additional insured as follows:

City of Portsmouth
Attn: Legal Department
1 Junkins Avenue
Portsmouth, NH 03801

3. Automobile Liability Combined Single Limit for bodily injury and property damage: \$ 2,000,000

4. The Contractual Liability coverage shall provide coverage for not less than the following amounts:

a. Bodily Injury:
Each Accident \$ 2,000,000
Annual Aggregate \$ 2,000,000

b. Property Damage:
Each Accident \$ 2,000,000
Annual Aggregate \$ 2,000,000

Coverage amounts may be satisfied by excess or umbrella policies provided the City of Portsmouth is listed as an additional on the excess/umbrella policy as well as the general liability policy.

Coverages shall include completed operations.

All other State required statutory requirements and coverages (Ex. Workers Compensation, etc.)

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

OWNER(Signature)

John P. Bohenko, City Manager

(Printed name and title)

CONTRACTOR(Signature)

TO BE DETERMINED

(Printed name and title)

**SECTION 00 72 00
GENERAL CONDITIONS**

GENERAL

1.01 FORM OF GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT

- A. AIA Document A201 - General Conditions of the Contract for Construction, 2007 Edition Amended, attached, is the General Conditions between the Owner and Contractor.

END OF SECTION

General Conditions of the Contract for Construction

THIS DOCUMENT CONTAINS MODIFICATIONS, DELETIONS, AND/OR ADDITIONS TO THE STANDARD AIA GENERAL CONDITIONS, 2007 EDITION. WHERE ANY PART OF THE AIA GENERAL CONDITIONS IS MODIFIED, DELETED OR SUPERSEDED AS INDICATED, THE UNALTERED PROVISIONS SHALL REMAIN IN FULL EFFECT.

for the following PROJECT:

(Name and location or address)

BID#37-17

Façade Replacement & Addition – Portsmouth City Hall
Portsmouth, New Hampshire

THE OWNER:

(Name, legal status and address)

City of Portsmouth, Portsmouth City Hall

1 Junkin

(Paragraph Deleted)

Avenue Portsmouth, New Hampshire
John P. Bohenko, City Manager

THE ARCHITECT:

(Name, legal status and address)

Lavallee Brensinger Architects

155 Dow Street, Suite 400

Manchester, New Hampshire 03101

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- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

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

§ 1.1.2 THE CONTRACT

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

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

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

§ 1.1.6 THE SPECIFICATIONS

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

§ 1.1.7 DESIGN DOCUMENTS

Design Documents are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Designers under their respective employment or professional services agreements. Design Documents may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Contract to render initial decisions on Claims in accordance with Section 15.2.

§ 1.1.9 PROVIDE:

The term "provide" shall include furnishing and installing a product, materials, systems, and/or equipment, complete in place, fully tested and approved.

§ 1.1.10 CUSTOM:

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The term "custom" when referring to a material, color, finish design, pattern, or configuration shall be understood to mean as selected or determined by the Architect, and shall in no way be limited to any of the published offerings of the supplier or manufacturer.

§ 1.1.11 SITE.

The term Site refers to that portion of the property on which the Work is to be performed or which has been otherwise set aside for use by the Contractor.

§ 1.1.12 PUNCH LIST

The term Punch List means, collectively, quality and completeness of finished and unfinished items of the construction of the Project, which the quality and completeness of finished and unfinished items of construction are minor or insubstantial details of construction, mechanical adjustment or decoration remaining to be performed, the non-completion of which would not materially affect the use of the Project, and which are capable of being completed within thirty (30) days of Substantial Completion, subject to the availability of special order parts and materials.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results. Should the Contract Documents disagree in themselves or with each other, the Contractor shall provide the better quality or greater quantity of work and/or materials, unless specifically otherwise directed by written Addendum to the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. The Contractor and all subcontractors shall refer to all of the Contract Documents, including those not specifically showing the Work of their specialized trades, and shall perform all work reasonably inferable from them as being necessary to produce the intended results.

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

§ 1.2.4 All indications or notations which apply to one of a number of similar situations, materials or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.

§ 1.2.5 Where codes, standards, requirements and publications of public and private bodies are referred to in the Contract Documents, such references shall be understood to be to the latest revision prior to the date of receiving Bids, except where otherwise indicated. These standards are not furnished to Bidders for the reason that the Bidders are assumed to be familiar with their requirements. The Architect will furnish, upon written request, information for obtaining copies of the standards referred to.

§ 1.2.6 Where no explicit quality or standards for materials or workmanship are established for work, such work is to be of good quality for the intended use and consistent with the quality of the surrounding work and of the construction of the Project generally.

§ 1.2.7 All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, adjusted, and conditioned in accordance with the manufacturers' written or printed directions and instructions, unless specifically otherwise indicated in the Contract Documents.

§ 1.2.8 For convenience, the Specifications have been arranged in Sections, but such separation shall not be considered as the limits of the Work required of any separate trade. The terms and conditions of such limitations shall be exclusively between the Contractor and his subcontractors. Requirements contained in any Section shall be required as if contained in all Sections and the Contractor shall, prior to awarding subcontracts, assure himself that the entire Work as a whole has been coordinated among the subcontracts.

§ 1.2.9 The Drawings are generally made to scale, but all working dimensions shall be taken from the figured dimensions, or by actual measurements at the job; in no case by scaling. Study and compare all the Drawings and verify all figures before laying out or constructing work. The Contractor shall be responsible for errors in his work that might have been avoided thereby. Whether or not an error is believed to exist, deviation from the Drawings and the dimensions given thereon shall be made only after approval in writing from the Architect.

§ 1.2.10 The Plumbing, Mechanical, Fire Protection (sprinkler) and Electrical Drawings, when provided, are diagrammatic only, and are not intended to show the exact physical locations or configurations of work. Such work shall be installed to clear all obstructions, permit proper clearances for the work of other trades, and present an orderly appearance where exposed. Locations of fixtures and outlets shall be obtained from the Architect before the Work is roughed in; work installed without such information from the Architect shall be relocated at the Contractor's expense.

§ 1.2.11 Surveys, test borings, test pits, or other soil test information when included with the Contract Documents or otherwise made accessible to the Contractor, were obtained by the Owner for use by the Architect in design. The Owner and Architect, do not represent such information to be complete, accurate or approximate indications of actual site or subsurface conditions.

§ 1.2.12 Where the Work is to fit with existing conditions or Work to be performed by others, the Contractor shall fully and completely join the Work with such conditions or Work, unless otherwise specified.

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

§ 1.4.2 In the event of conflict among the various provisions of the Contract Documents, the terms shall be interpreted in the following order of priority:

- .1 Modifications to the Contract
- .2 The Contract
- .3 Special Conditions
- .4 General Conditions

Where conflict may exist within the Drawings, Specifications between each or within each self-refer to Sections 1.2.1 and 3.2.2.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER DESIGN DOCUMENTS

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Design Documents, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Owner shall retain ownership rights to the Design Documents as their interests may appear per agreement of the Owner/Architect Contract including the Drawings and Specifications. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Design Documents provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Design Documents. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Design Documents on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

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§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Design Documents or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Contract or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization except with regard to a Change Order increasing the Contract Sum which shall require the approval of the City Manager. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

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

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

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

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

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

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner, or such shorter time as may be reasonable under the circumstances, to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

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

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor. The Contractor waives any rights, claims, or causes of action against Owner as a result of activities or duties of the Architect in the Architect's administration of the Contract or representations made by the Architect in the Design Documents.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 By executing the Contract, the Contractor represents that the Contractor has reviewed and understands the Contract Documents, has visited the Site and is familiar with local conditions under which the Work is to be performed, has correlated personal observations with the requirements of the Contract Documents, and has notified the Architect of and obtained clarification of any discrepancies which have become apparent during the bidding or proposal period.

§ 3.2.2 Since the Contract Documents are complementary, before starting each portion of the Work, the Contractor shall carefully study and compare the various Drawings and other Contract Documents (including existing As-Built Drawings if available) relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.23, shall take field measurements of any existing conditions related to that portion of the Work and shall observe and document any conditions at the site affecting it. Before starting the Work, and at frequent intervals during the progress thereof, the Contractor shall carefully study and compare the Contract Documents with each other and with the information furnished by the Owner pursuant to Subparagraph 2.2 and shall at once report to the Architect any error, inconsistency or omission the Contractor may discover. Any necessary change shall be ordered as provided in Article 7, subject to the requirements of Article 1.2 and other provisions of the Contract Documents. If the Contractor proceeds with the Work without such notice to the Architect, having discovered such errors, inconsistencies or omissions, or if by reasonable study of the Contract Documents the Contractor should have discovered such, the Contractor shall bear all costs arising therefrom.

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

§ 3.2.4 The Contractor must take field measurements and verify Site conditions, and must carefully compare such field measurements and Site conditions and other information known to the Contractor with the Contract Documents, before ordering any material or doing any Work at the Site.

§ 3.2.5 The Contractor must make frequent inspections during the progress of the Work to confirm that Work previously performed by the Contractor is in compliance with the Contract Documents and applicable laws and

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regulations bearing on the performance of the Work and Referenced Standards and that portion of Work previously performed by the Contractor or by others are in proper condition to receive subsequent Work.

§ 3.2.6 If the Contractor believes that any portions of the Contract Documents do not comply with applicable laws, statutes, ordinances, building codes, and rules and regulations, or any orders by code enforcement officials or the Owner or its designees acting in the capacity of building code inspectors or Referenced Standards, the Contractor must promptly notify the Owner and the Architect of the non-compliance as provided in Section 3.2.6 and request direction before proceeding with the affected Work.

§ 3.2.7 The Contractor must promptly notify the Owner and the Architect in writing of any apparent errors, inconsistencies, omissions, ambiguities, construction impracticalities or code violations discovered as a result of the Contractor's review of the Contract Documents including any differences between actual and indicated dimensions, locations and descriptions, and must give the Owner and the Architect timely notice in writing of same and of any corrections, clarifications, additional Drawings or Specifications, or other information required to define the Work in greater detail or to permit the proper progress of the Work. The Contractor must provide similar notice with respect to any variance between its review of the Site and physical data and Site conditions observed.

§ 3.2.8 If the Contractor performs any Work involving an apparent error, inconsistency, ambiguity, construction impracticality, omission or code violation in the Contract Documents of which the Contractor is aware, or which could reasonably have been discovered by the review required by Section 3.2, without prompt written notice to the Owner and the Architect and request for correction, clarification or additional information, as appropriate, the Contractor does so at its own risk and expense and all claims relating thereafter are specifically waived.

§ 3.2.9 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

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

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

§ 3.4 LABOR AND MATERIALS

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

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

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them. Persons permitted to perform Work under Contractor or any Subcontractor or Sub-Subcontractor shall meet all employment eligibility, safety training, security or drug/alcohol testing requirements required by law or by Owner. Any person not complying with all such requirements shall be immediately removed from the Site.

§ 3.5 WARRANTY

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

§ 3.5.2 The Contractor shall be responsible for determining that materials furnished for the Work meet all requirements of the Contract Documents. The Architect may require the Contractor to produce reasonable evidence that a material meets such requirements, such as certified reports of past tests by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents. All such data shall be furnished at the Contractor's expense. This provision shall not require the Contractor to pay for periodic testing of different batches of the same material, unless such testing is specifically required by the Contract Documents to be performed at the Contractor's expense.

§ 3.5.3 The Contractor's general warranty and any additional or special warranties are not limited by the Contractor's obligations to specifically correct defective or nonconforming Work as provided in Article 12, or are they limited by any other remedies provided in the Contract Documents. The Contractor shall also be liable for any damage to property or persons (including death) including consequential and direct damages relating to any breach of the Contractor's general warranty or any additional or special warranties required by the Contract Documents.

§ 3.5.4 The Contractor must furnish all special warranties required by the Contract Documents to the Owner no later than Substantial Completion. The Owner may require additional special warranties in connection with the approval of "Or-Equals" or Substitutions, Allowance items, Work that is defective or nonconforming, or the acceptance of nonconforming Work pursuant to Article 12.

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

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

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§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

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

§ 3.7.4 If the Contractor encounters conditions at the Site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide written notice to the Owner and the Architect before conditions are disturbed and in no event later than seven (7) days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

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

§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.9 SUPERINTENDENT

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

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the

proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

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

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, within twenty-one (21) days of the execution of the Contract, shall prepare and submit for the Owner's and Architect's review a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work. Thereafter, the Contractor shall prepare and update the construction schedule on a monthly basis ("Current Construction Schedule"), if not more frequently at the Owner's discretion, to be submitted to the Owner with each Application for Payment.

§ 3.10.2 The Contractor shall prepare a submittal schedule, within twenty-one (21) days of the execution of the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Owner's and Architect's approval. The Owner's and Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

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

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one record copy of the Drawings, Specifications, Addenda, Current Construction Schedule, Change Orders and other Modifications in good order and marked currently to record changes and selections made during construction, and in addition, reviewed Shop Drawings, Product Data, Samples and similar required submittals. The Contractor shall display a Current Construction Schedule at the site for reference and reliance by the Owner and Architect. These shall be available to the Architect and, along with reproducible copies as identified elsewhere in the Contract Documents, shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of

the Owner or of separate contractors. The Contractor must provide the Owner and the Architect with copies of all submittals made to regulatory agencies. It is the intent of this Contract that the use of asbestos containing materials and/or other hazardous materials be prohibited. Prior to Substantial Completion, the Contractor shall submit written certification that no asbestos and/or other hazardous substances have been incorporated into the Work.

In failing to provide such certification, the Contractor shall assume full responsibility related thereto, and shall be responsible for all injury and/or damages, and shall provide all necessary replacement or corrective work at no additional cost to the Owner.

§ 3.12.6 By approving and submitting Shop Drawings, Product Data, Samples and similar materials, the Contractor represents to the Owner and Architect that the Contractor has determined and verified materials, dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously reviewed Shop Drawings, Product Data, or Samples and verification of compliance with all of the requirements of the Contract Documents. The completeness and accuracy of all such information is the responsibility of the Contractor. In reviewing Shop Drawings, Product Data, and Samples, the Architect and Owner shall be entitled to rely upon the Contractor's representation that such information is complete, accurate and correct.

§ 3.12.7 The Contractor shall perform no portion of the Work requiring submittal and review of Shop Drawings, Product Data, Samples or similar materials until the respective submittal has been reviewed by the Architect. Such Work shall be in accordance with the reviewed submittals.

Shop Drawings, Product Data and Samples submitted to the Architect without the Contractor's signed stamp of approval thereon will be returned without action. The Contractor shall also, upon delivery of submittals, provide written notice of any deviation in the Shop Drawings, Product Data or Samples from the requirements of the Contract Documents.

The Contractor must correct at its cost, and without any adjustment in Contract Time, any Work the correction of which is required due to the Contractor's failure to obtain approval of a submittal required to have been obtained prior to proceeding with the Work, including, but not limited to, correction of any conflicts in the Work resulting from such failure.

§ 3.12.8 The Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's review of Shop Drawings, Product Data, Samples, or similar materials unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in the Shop Drawings, Product Data, Samples, or similar materials by the Architect's review thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions. Unless such written notice has been given, the Architect's review of a resubmitted Shop Drawing, Product Data, Sample or similar material shall not constitute acceptance of any changes not specifically requested on the prior submittal.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled

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to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.12.11 No claim for delay shall be allowed on account of failure of the Architect to furnish instructions or to return Shop Drawings, Product Data, Samples, or similar materials until two (2) weeks after receipt by the Architect by registered or certified mail of a written demand for such instructions, drawings, or samples, and not then unless such claim be reasonable.

§ 3.12.12 The Contractor shall provide all calculations and certificates of compliance and performance as identified throughout the Contract Documents. He shall be responsible for their preparation and submission and the Owner and Architect shall be entitled to rely upon the completeness and accuracy of all such calculations and certifications. Failure to submit such calculations and certificates prior to Substantial Completion shall be considered representation of full compliance, as if they had been fully executed and provided for the Owner and Architect's records.

§ 3.12.13 The Contractor shall be allowed one (1) submission, plus one (1) revision to obtain the Architect's review and acceptance of Shop Drawings, Product Data, Samples or similar materials. Incorrect, incomplete or otherwise unacceptable submissions, that require additional submittals shall be reviewed by the Architect subject to back-charges to the Contractor for the cost of the Architect's related services.

§ 3.13 USE OF SITE

§ 3.13.1 The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment. Contractor shall coordinate use of the Site with the Owner; contractor recognizes the need to preserve the operations of any municipal operations at the Site.

§ 3.13.2 Except as may be specifically provided in the Contract Documents, the Contractor shall provide all necessary temporary facilities, including power, water, sanitation, scaffolding, storage, and security. If Owner makes any such facilities available to Contractor, it is without representation or warranty as to their adequacy for Contractor's use, and Contractor shall indemnify, defend, and hold Owner harmless from and against any claims arising out of Contractor's use of such

(Paragraph Deleted)

facilities.

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.15 WORKING HOURS AND CLEANING UP

§ 3.15.1 Work will be performed in accordance with the Contract Documents and the City of Portsmouth noise ordinance or other applicable law governing the Contractor's performance of the Work. No delays resulting from compliance with applicable laws or regulations may form the basis for any claim by the Contractor for delay damages or additional compensation or for any extensions of the Contract Time. The Contractor must not permit

work outside of hours established in the Contract Documents on a Saturday, Sunday or other City/County, State or federal holiday without the written consent of the Owner, given after prior written notice to the Architect and any other applicable consultants; such consent, if given, may be conditioned upon payment by the Contractor of the Owner's, Architect's and any other applicable consultants' additional costs and fees, testing or regulatory agency costs incurred in monitoring such off-hours Work. The Contractor must notify the Owner as soon as possible if Work must be performed outside such times in the interest of the safety and protection of persons or property at the Site or adjacent thereto, or in the event of an emergency. In no event shall the Contractor permit Work to be performed at the Site without the presence of the Contractor's superintendent and person responsible for the protection of persons and property at the Site and compliance with all applicable laws and regulations, if different from the superintendent.

§ 3.15.2 The Contractor must keep the Site and adjacent areas free from accumulation of waste materials or rubbish caused by operations under the Contract, and must keep tools, construction equipment, machinery and surplus materials suitably stored when not in use. If the Contractor fails to do so in a manner reasonably satisfactory to the Owner or the Architect within forty-eight (48) hours after notice or as otherwise required by the Contract Documents, the Owner may clean the Site and back charge the Contractor for all costs associated with the cleaning. The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project. *(Paragraph Deleted)*

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify, defend and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18. Defense shall be provided by counsel acceptable to Owner and Architect.

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

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

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

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

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

§ 4.2 ADMINISTRATION OF THE CONTRACT

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

§ 4.2.2 The Architect will visit the Site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

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

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

The Owner and Contractor shall include the Architect in communications about matters arising out of or relating to the aspects of the Contract which involve the Architect. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

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

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken

in accordance with the submittal schedule reviewed by the Architect or, in the absence of an reviewed submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's review of a specific item shall not indicate approval of an assembly of which the item is a component.

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

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

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

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

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

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

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

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of

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persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection. The Contractor shall update this list throughout the Project and keep Owner and the Architect advised of any new Subcontractors employed.

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

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

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

§ 5.2.5 Provisions contained in Paragraphs 5.2.1 through 5.2.4 shall apply to only those Subcontractors not affected by the requirements of pre-qualification as set forth in the Instructions to Bidders or Instructions to Sub-Bidders.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.1 Nothing contained in the Contract Documents shall create any contractual relations between the Owner or Architect and any Subcontractor or Sub-subcontractor, nor shall there be any obligation on the Owner to pay or to see to the payment of any sums due any Subcontractor, nor create any obligation of any kind, express or implied, upon the Owner or Architect in favor of any Subcontractor or Sub-subcontractor.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

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

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

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

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

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

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

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

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

§ 6.2 MUTUAL RESPONSIBILITY

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

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

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

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

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

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the cost shall be equitably apportioned among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.2 CHANGE ORDERS

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

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

§ 7.2.2 **Change Proposals.** The Contractor must submit change proposals covering a contemplated Change Order within fourteen (14) days after request of the Owner, or the Architect or within fourteen (14) days of the event giving rise to the Contractor's claim for a change in the Contract Sum or Contract Time. No increase in the Contract Sum or extension of the Contract Time will be allowed the Contractor for the cost or time involved in making change proposals. Change proposals will define or confirm in detail the Work which is proposed to be added, deleted, or changed and must include any adjustment which the Contractor believes to be necessary in (i) the Contract Sum, or (ii) the Contract Time. Any proposed adjustment must include detailed documentation including but not limited to: cost, properly itemized and supported by sufficient substantiating data to permit evaluation including cost of labor, materials, supplies and equipment, rental cost of machinery and equipment, additional bond cost, plus a fixed fee for profit and overhead (which includes office overhead and site-specific overhead and general conditions) of ten percent (10%) if the Work is performed by the Contractor, or five percent (5%) if the Work is performed by a Subcontractor or Sub-subcontractor. The Subcontractors or Sub-subcontractors overhead and profit in turn must not exceed a total aggregate of ten percent (10%). Change proposals will be binding upon the Contractor and may be accepted or rejected by the Owner in its discretion. The Owner may, at its option, instruct the Contractor to proceed with the Work involved in the change proposal in accordance with this Section 7.2.2 without accepting the change proposal in its entirety.

- .1 Cost to which overhead and profit is to be applied shall be determined in accordance with subparagraph 7.3.7.
- .2 In order to facilitate checking of quotations for extras or credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete and detailed itemization of all costs, including labor, material and subcontracts. In no case will a change involving over \$500.00 be approved without such itemization.
- .3 No percentage for overhead and profit will be allowed on changes in the Work which are set forth as unit price items, as the percentage for same shall be included in said unit prices.

§ 7.2.3 If the Owner determines that a change proposal is appropriate, the Architect will prepare and submit a request for a Change Order or Contract Amendment providing for an appropriate adjustment in the Contract Sum or Contract Time, or both, for further action by the Owner. No such change is effective until the Owner and Architect sign the Change

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§ 7.3 CONSTRUCTION DIRECTIVES

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon; Should the Owner choose to accept proposed unit prices, his acceptance thereof presupposes their reasonably representing the actual cost of the Work involved, plus a fair and reasonable allowance for overhead and profit. "Cost" shall be defined as described in Paragraph 7.3.7 of this Contract.
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

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

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Owner and the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount including, in case of an increase in the Contract Sum, an allowance for overhead and profit in accordance with Paragraph 7.2.2. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

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

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

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

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the Site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner, or prior to approval of Certificates of Insurance, and Additional Insured Endorsement and Notice of Cancellation Endorsement required to be submitted to Owner under the Contract. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. If Contractor's Work shall fall behind schedule for reasons that are not excused under the terms of the Contract, Contractor shall add additional workers or shifts, and/or work overtime as necessary to maintain the Construction Schedule at no additional cost to the Owner.

§ 8.2.4 The Contractor must conform to the most recently reviewed Construction Schedule. The Contractor must complete the indicated Work or achieve the required percentage of completion, as applicable, within any interim completion dates established in the most recently approved Construction Schedule.

§ 8.2.5 The Contractor represents that its bid includes all costs, overhead and profit which may be incurred throughout the Contract Time and the period between Substantial and final Completion. Accordingly, the Contractor may not make any claim for delay damages based in whole or in part on the premise that the Contractor would have completed the Work prior to the expiration of the Contract Time but for any claimed delay.

§ 8.2.6 If the Contractor's progress is not maintained in accordance with the reviewed Construction Schedule, or the Owner determines that the Contractor is not diligently proceeding with the Work or has evidence reasonably indicating that the Contractor will not be able to conform to the most recently reviewed Construction Schedule, the Contractor must, promptly and at no additional cost to the Owner, take all measures necessary to accelerate its progress to overcome the delay and ensure that there will be no further delay in the progress of the Work and notify the Owner.

§ 8.2.7 The Owner reserves the right to issue a written directive to accelerate the Work that may be subject to an appropriate adjustment, if any, in the Contract Sum. If the Owner requires an acceleration of the Construction Schedule and no adjustment is made in the Contract Sum, or if the Contractor disagrees with any adjustment made, the Contractor must file a claim as provided in Article 15 or the same will be deemed to be conclusively waived.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, excusable weather delays as defined in §15.1.5.2, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending dispute resolution; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

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

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

8.3.4 In planning his construction schedule within the agreed upon Contract Time, it shall be assumed that the Contractor has anticipated the amount of adverse weather conditions normal to that of Work for the season(s) of the year involved. Only those weather delays attributable to other than normal weather conditions will be considered by the Owner and Architect.

8.3.5 Delays in the execution of portions of the Work, which do not necessarily prevent or delay the execution of other parts of the Work and, which do not necessarily prevent the completion of the whole of the Work within the time specified, shall not be considered justifiable cause for extension of the Project completion date.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect and Owner, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect or Owner may require. This schedule, unless objected to by the Architect or Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

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

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

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

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site. In addition to all other procedures required by the Owner for the protection of his interests, the Contractor, in submitting an Application for Payment, certifies that he has visited all locations of materials and equipment stored off-site and verified the types and quantities of materials and equipment stored as well as the suitability and security of the storage facilities.

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

§ 9.3.4 The Contractor must submit to the Architect itemized Applications for Payment for Work completed on a monthly basis in accordance with a schedule approved by the Owner. Each Application for Payment must be consistent with the approved Schedule of Values. In order to expedite the review and approval of Applications for Payment, the Contractor may submit to and review with the Architect and Owner a draft Application for Payment at a progress meeting prior to submitting a formal Application for Payment.

§ 9.3.5 The form of Application for Payment must be AIA Document G702, Application and Certificate for Payment, supported by AIA Document G703, Continuation Sheet (latest edition), or such other form as may be prescribed by the Owner. The application must be notarized and supported by sufficient data to demonstrate the Contractor's right to payment and compliance with the payment provisions of the Contract to the satisfaction of the Owner and Architect, such as copies of requisitions from Subcontractors and material suppliers, partial lien waivers, releases and other documents. Each Application for Payment must reflect approved Contract Modifications and the Contract retainage provided for in the Contract Documents.

§ 9.3.6 Applications for Payment may include materials and equipment delivered and suitably stored at the Site for subsequent incorporation in the Work. The Owner has no obligation or responsibility to pay for materials stored off the Site. If specifically approved in writing in advance by the Owner, an Application for Payment may include materials and equipment stored off the Site at a location agreed upon in writing. Payment for materials and equipment stored on or off the Site is conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to protect the Owner's interests. Payment for materials and equipment stored off the Site will, in addition, be conditioned upon the Contractor's provision of applicable insurance, storage and transportation to the Site.

§ 9.3.7 Payments received by the Contractor are held in trust for Subcontractors and suppliers who have furnished labor and materials covered by an Application for Payment. Accordingly, Applications for Payment may not include requests for payment of amounts for Work performed by a Subcontractor or Supplier that the Contractor does not intend to pay for said work.

§ 9.3.8 Until the conditions set forth in this Section have been satisfied by Contractor, the amount of each monthly Application for Payment must include the value of each line item as indicated on the approved Schedule of Values,

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to the extent completed, less Contract retainage of ten percent (10%). The retainage will not be paid to the Contractor until thirty (30) days after all of the following conditions have been satisfied: (A) the Contractor has fully performed the Contract; (B) the Contractor has completed all Punch List items to the satisfaction of the Owner and the Architect; (C) the Contractor has delivered to the Owner all Project close-out documents in duplicate, including (1) all maintenance and operating manuals; (2) marked sets of as-built drawings; (3) all guarantees and warranties required under the Contract Documents; (4) a list of names, addresses, and telephone numbers for all subcontractors and others providing guarantees and warranties; and (D) the applicable governmental authorities have issued to the Owner the final use and occupancy permit for the Project.

.1 The Owner at any time, however, after fifty percent (50%) of the Work has been completed, if he finds that satisfactory progress is being made, shall on presentation by the Contractor of Consent of Surety, for each application, reduce the retainage to zero percent (0%) of the Work requisitioned on remaining Applications for Payment. The ten percent (10%) retained during the first fifty percent of the Work, per sole discretion of the Owner, may be reduced to five percent (5%) retained withheld until Substantial Completion.

2. Upon Substantial Completion of the entire Work, the retainage shall be reduced to two percent (2%) retained plus the value of any punch list items, as determined by the Architect and agreed to by the Owner.

3. Upon completion of any or all punch list items, the Contractor shall submit an Application for Payment equivalent to the value of punch list items as set forth per 9.3.8.2 above. The two percent (2%) retained will be kept by the Owner, in escrow, for a period of one (1) calendar year (three hundred and sixty five (365) days).

4. After the one year period the Contractor shall submit Application for Payment equivalent to the two percent (2%) retained plus interest accrued through escrow.

§ 9.3.9 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner, no later than the time of payment. By submitting an Application for Payment, the Contractor further warrants that all Work for which payments have previously been received from the Owner are free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities having provided labor, materials and equipment relating to the Work.

§ 9.3.10 Before the Contractor receives a progress payment, the Contractor must certify in writing that, in accordance with contractual arrangements, Subcontractors and suppliers:

- .1 have been paid from the proceeds of previous progress payments; and
- .2 will be paid in a timely manner from the proceeds of the progress payment currently due.

In the event the Contractor has not paid or does not pay as certified, such failure constitutes a ground for termination under Section 14.2 of the Contract. Contractor shall submit Applications for Payment to Architect on a monthly basis or as otherwise specified in the Contract Documents. Once the Architect submits a completed Application for Payment with its Certificate of Payment to the Owner, the Owner within twenty-one (21) days after its receipt and approval of a Request for Payment from the Architect, shall pay the approved amount contained in the Request for Payment to the Contractor.

§ 9.4 CERTIFICATES FOR PAYMENT

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

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-

site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

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

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

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

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided in the Conditions of the Contract as follows, and shall so notify the Architect:

- .1 On or about the twentieth day of each month, for work completed before the first day of the month, ninety percent (90%) of the portion of the Contract Sum properly allocated to labor, materials and equipment incorporated in the Work and ninety percent (90%) of the portion of the Contract Sum properly allocated to materials and equipment suitably stored at the site or at some other location agreed upon in writing by the parties, less then aggregate of previous payments in each case.
- .2 All payments shall be subject to the approval of the Owner, who retains the right to inspect and fully approve the Work prior to release of payments.
- .3 The full Contract retainage may be reinstated at any time if the manner of completion of the Work and its progress do not remain satisfactory to the Architect, or if the Surety withholds consent, or for other good and sufficient reasons.
- .4 The Contractor's fee for Construction Management services shall not be subject to the above retainages

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

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

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

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

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

§ 9.6.7

§ 9.7 FAILURE OF PAYMENT

If the Owner does not pay the Contractor sixty (60) days after the Contractor submits an Application for Payment to the Architect, the Contractor may file a claim in accordance with Article 15 of this Contract.

§ 9.8 SUBSTANTIAL COMPLETION

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

§ 9.8.2 Contractor considers that the Work is substantially complete and that items remaining to be completed or corrected can be accomplished within another thirty (30) days, subject to the availability of special order parts and materials, the Contractor must give written notice to the Owner and the Architect and request a review of the Work as provided in Section 9.8.3. The Contractor's notice and request for a review must be accompanied by a comprehensive Punch List describing all items to be completed or corrected before final Completion and the submittals required by Section 9.8.2. The Contractor must proceed promptly to complete and correct items on the list. Failure to include an item on such list does not alter the Contractor's responsibility to complete all Work in accordance with the Contract Documents.

§ 9.8.3 In addition to the Punch List, the Contractor must submit the following with its request for a determination of Substantial Completion:

1. a use and occupancy permit;
 1. final test reports as required by the Contract and certificates of inspection and approval required for use and occupancy;
 2. Fire Department sign off;
 3. approvals from, and transfer documents for, all utilities;
 4. Warranties and Guarantees as provided in this Contract;
 5. final, approved operating and maintenance manuals;
 6. all documents and verification of training required in accordance with any Commissioning Plan; and
 7. Schedule to complete the Punch List and value of Work not yet complete.

§ 9.8.4 Upon receipt of the Punch List, the Architect will review the work to be in general conformance of the Design Documents to determine whether the Work or designated portion thereof is substantially complete and whether remaining items can be completed or corrected within thirty (30) days subject to the availability of special order parts and materials. The Owner may make a similar inspection. If such inspection discloses any item, whether or not included on the Punch List, which, in the opinion of the Owner or the Architect, (i) must be completed or corrected before the Work can be occupied or used for its intended purpose, or (ii) cannot be completed or corrected within thirty (30) days, subject to the availability of special order parts and materials the Architect will so advise the Contractor, and the Contractor must promptly complete or correct such item.

§ 9.8.5 Following the review and completion or correction of Work required by the Owner or the Architect before issuance of a Certificate of Substantial Completion, the Contractor must notify the Owner and Architect and request another review of work by the Owner and the Architect to determine Substantial Completion. The Contractor must submit a revised Punch List with such notice. The Architect will promptly notify the Contractor if the Owner or the

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Architect do not concur that the Work is substantially complete. In such case, the Contractor must bear the cost of any additional services of the Owner or the Architect until the Work is determined to be Substantially Complete.

§ 9.8.6 When the Owner and the Architect concur that the Work is Substantially Complete and that Work remaining to be completed or corrected can be accomplished within a period of thirty (30) days, subject to the availability of special order parts and materials, the Architect will prepare a Certificate of Substantial Completion and a revised Punch List. The Certificate of Substantial Completion will fix the Date of Substantial Completion and the time periods within which the Contractor must finish all items on the Punch List accompanying the Certificate.

§ 9.8.7 The Certificate of Substantial Completion and accompanying Punch List must be submitted to the Owner and Contractor for execution, which will constitute their written acceptance of responsibilities assigned to them in such Certificate.

§ 9.8.8 To the extent provided in the Contract Documents or in the Certificate of Substantial Completion, the Owner, upon execution of the Certificate, will assume responsibility for security, operation, safety, maintenance, heat, utilities, damage to the Work (other than damage caused by the Contractor) and insurance.

§ 9.8.9 Warranties required by the Contract Documents will commence on the Date of Substantial Completion of the Work unless otherwise provided in the Certificate of Substantial Completion or the Contract Documents.

§ 9.8.10 Upon execution of the Certificate of Substantial Completion, the Contractor will deliver custody and control of such Work to the Owner. The Owner will thereafter provide the Contractor reasonable access to such Work to permit the Contractor to fulfill the correction, completion and other responsibilities remaining under the Contract and the Certificate of Substantial Completion.

§ 9.8.11 Unless otherwise provided in the Certificate of Substantial Completion, the Contractor must complete or correct all items included in the final Punch List within thirty (30) days, subject to the availability of special order parts and materials, after the Date of Substantial Completion.

§ 9.8.12 At the time of Substantial Completion, in addition to removing rubbish and leaving the building "broom clean," the Contractor must replace any broken or damaged materials, remove stains, spots, marks and dirt from decorated Work, clean all fixtures, vacuum all carpets and wet mop all other floors, replace HVAC filters, clean HVAC coils, and comply with such additional requirements, if any, which may be specified in the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, or reduction in liquidated damages, if appropriate, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

(Paragraph Deleted)

§9.10.1 When the Contractor has completed or corrected all items on the final Punch List and considers that the Work is complete and ready for final acceptance, the Contractor must give written notice to the Owner and the

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Architect and request a final inspection of the Work as provided in Section 9.10.2. The Contractor's notice and request for a final inspection must be accompanied by a final Application for Payment and the Submittals required by Section 9.10.3.

§9.10.2 Upon receipt of the Contractor's notice and request for final inspection, the Owner and the Architect will promptly make such inspection and, when the Owner and the Architect concur that the Work has been fully completed and is acceptable under the Contract Documents, the Architect will issue a Certificate of Final Completion to the Owner. The Contractor's notice and request for final inspection constitutes a representation by the Contractor to the Owner that the Work has been completed in full and strict accordance with terms and conditions of the Contract Documents. The Architect will promptly notify the Contractor if the Owner or the Architect do not concur that the Work is finally complete. In such case, the Contractor must bear the cost of any additional services of the Owner or the Architect until the Work is determined to be finally complete.

§ 9.10.3 Neither final payment nor any remaining retained percentage will become due until the Contractor submits the following documents to the Architect:

1. an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner), have been paid or otherwise satisfied, submitted on AIA Document G706, Affidavit of Payment of Debts and Claims (latest edition) or such other form as may be prescribed by the Owner;
2. a release or waiver of liens on behalf of the Contractor and a similar release or waiver on behalf of each Subcontractor and supplier, accompanied by AIA Document G706A, Affidavit of Release of Liens (latest edition) or such other form as may be prescribed by the Owner;
3. a certificate evidencing that the Contractor's liability insurance and Performance Bond remain in effect during the one-year correction period following Substantial Completion as set forth in Section 12.2.2.1 and 12.2.2.2;
4. a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents;
5. consent of surety to final payment, submitted on AIA Document G707 (latest edition) or other form prescribed by the Owner;
6. other data required by the Owner establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be prescribed by the Owner;
7. a certified building location survey and as-built site plan in the form and number required by the Contract Documents;
8. all warranties, bonds, and Record Documents not already provided as part of substantial completion;
9. Attic stock items as required by the Contract Documents; and

9.10.4 If the Contractor is unable to secure from any Subcontractor or supplier a release or waiver required under the Contract, the Contractor may at the discretion of the Owner be required to furnish a bond satisfactory to the Owner to indemnify the Owner and any co-obligees under the bond against any lien or claim from such Subcontractor or supplier. The Contractor must also indemnify the Owner for all costs incurred by the Owner in removing, discharging or otherwise settling all Subcontractor or supplier liens or claims, including all personnel and consultant costs and reasonable attorneys' fees.

(Paragraphs Deleted)

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1** All persons at the Site and other persons who may be affected by the Work or other operations of the Contractor;
- .2** the Work and materials and equipment to be incorporated therein or otherwise utilized in the performance of the Contract, whether in storage on or off the Site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

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

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

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

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

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

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

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

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable damage or injury resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), petroleum or petroleum by products and any other toxic or hazardous substances, which may be discovered or otherwise deposited at the Project, encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing within twenty-four (24) hours.

§ 10.3.2 Upon receipt of the Contractor's written notice of suspected Hazardous Materials, Owner will cause an investigation to be made to verify the presence and extent of such materials, to determine whether such materials are in fact hazardous, and the steps necessary for their removal, containment or remediation. The Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether

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or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. If the Owner's investigation confirms the presence of Hazardous Materials which present a risk of injury or damage which will not be adequately protected against by the Contractor's reasonable precautions, then the Work in the affected area must not thereafter be resumed except at the written direction of the Owner. The Work in the affected area will be resumed promptly (i) in the absence of a finding of Hazardous Material by the Owner, (ii) upon the removal, containment or remediation of the Hazardous Materials, or (iii) upon the establishment of appropriate safety precautions. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall release the Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of Architect, Architect's consultants and agents and employees.

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

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the Site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

10.3.6 The Architect's scope of services and responsibilities excludes work related to asbestos, radon, petroleum and petroleum by products, polychlorinated biphenyl and other toxic or hazardous substances. Therefore, the Architect shall have no responsibility for any consequences resulting from the investigation, discovery, detection, identification, presence, leakage, discharge, release, use, handling, disposal, encapsulation, abatement, treatment, or removal of, or exposure of a person or persons to hazardous materials, pollutants, contaminants, or disease transmitting organisms, pre-existing or otherwise deposited in any form at the project, indoors or outdoors, at any time before, during or after construction, including but not limited to volatile organic compounds, petroleum products, bacteria, molds, fungus, asbestos or asbestos products, lead, radon, electro-magnetic frequency radiation or other radiation.

10.3.7 The Contractor shall be responsible for compliance with all applicable Local, State, and Federal environmental regulations, including but not limited to the National Emission Standard for Hazardous Air Pollutants, as enforced by the United States Environmental Protection Agency. It shall be the Contractor's responsibility to provide all inspections and notifications related thereto.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7. In an emergency affecting safety of persons or property, the Contractor must take all necessary action, without the necessity for any special instruction or authorization from the Owner or Architect, to prevent threatened damage, injury or loss. The Contractor must promptly, but in all events within twenty-four (24) hours of the emergency, report such action in writing to the Owner and Architect. If the Contractor incurs additional costs on account of or is delayed by such emergency, so long as such emergency was not incurred due to the negligence, error or other actions/inactions of the

Contractor or the Contractor's sub-contractors, the Contractor may request a change in the Contract Sum or Contract Time to account for such additional costs or delay in accord with Articles 7, 8 and 15.

ARTICLE 11 INSURANCE AND BONDS

Prior to the execution of a Contract, the Owner and Contractor, with the assistance of their respective insurance advisors as they deem necessary, shall review all of the insurance requirements related to this Project in order to determine the types and limits of coverage required. The Architect claims no expertise related to insurance and will offer no advice or assistance related thereto.

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations. The full benefits of such insurance shall be available to the Owner and Architect, whose coverage as additional insureds shall not in any way be compromised by endorsements or other modifications to the Contractor's policy.

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§11.1.5 Contract shall, in addition to certificate of insurance, provide such additional documentation as may be reasonably requested by the Owner to confirm coverages and amounts.

§11.1.6 The Cost(s) of insurance, as required per 11.1, shall be included within the Base Bid of the project. Bids submitted not including such cost(s), per sole discretion of the Owner, may be
(Paragraph Deleted)

rejected.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Owner maintains property insurance through Primex. Coverage through Primex includes Buildings Risk Coverage to protect the Owner's interest only in the Project.

(Paragraph Deleted)

§ 11.3.1.1 The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.2 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

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11.3.1.3 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner only.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If requested, Owner shall provide Contractor with documentation of
(Paragraph Deleted)

Owner's policies and coverages.

(Paragraphs Deleted)

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

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

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect, upon written authorization from the Owner, may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

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

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

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

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

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

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

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

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by, and construed in accordance with, the laws of the State of New Hampshire without regard to its conflict of laws provisions.

§ 13.2 SUCCESSORS AND ASSIGNS

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

(Paragraph Deleted)

§ 13.3 WRITTEN NOTICE

Written notices are to be provided to the representatives of the parties designated in this Contract. Written notices are deemed to have been duly served if delivered in person to the addressee for whom it was intended, or if delivered by overnight courier. The date of any notice is deemed to be the earlier of the date of personal delivery or the delivery by overnight courier.

§ 13.4 RIGHTS AND REMEDIES

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

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

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor must schedule all tests, inspections or specific approvals required by law or the Contract Documents so as to avoid any delay in the Work. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that

the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

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

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

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

§ 13.5.7 In addition to the tests required by this Section 13.5, the Owner may at any time arrange for other tests, inspections and specific approvals to be performed by others selected by the Owner, at the Owner's expense. The Contractor must cooperate with the Owner and provide access to the Work for such tests, inspections and approvals.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the time period specified by applicable law.

§ 13.8 DOCUMENT RETENTION AND AUDIT PROVISIONS

Contractor shall account for all materials, equipment and labor entering into the Work and must keep such full and detailed records as may be necessary for proper financial management pursuant to the Contract Documents for a period of five (5) years after final payment. Furthermore, the Owner has the right to examine the Contractor's and its Subcontractors' and suppliers' records directly or indirectly pertaining or relating to the Work or the Contract and the Contractor must grant the Owner access to and an opportunity to copy such records at all reasonable times during the Contract period and for five (5) years after final payment.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

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

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

§14.1.2 NO RIGHT TO STOP WORK FOR NON-PAYMENT

The Contractor has no right to stop Work as a consequence of non-payment for any claim or aggregate of claims with a value of less than twenty percent (20%) of the total Project Cost. In the event of any disagreement between the Contractor and Owner involving the Contractor's entitlement to payment, the Contractor's only remedy is to file a Claim in accordance with Article 15. The Contractor must diligently proceed with the Work pending resolution of the Claim. If, however, an Application for Payment has been approved for payment by the Owner, and the Owner fails to make payment within sixty (60) days of the approval for payment by the

Owner, the Contractor may upon ten (10) days written notice to the Owner, stop work if payment is not made by the Owner within ten (10) days following the notice.

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

§ 14.1.4 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

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

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 The Owner may terminate the Contract for cause if the Contractor:

- .1 Fails to supply adequate properly skilled workers or proper materials;
- .2 Fails to make payment to Subcontractors or Suppliers for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors or Suppliers;
- .3 Fails to comply with any laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction;
- .4 Fails to perform the Work in accordance with the Contract Documents or otherwise breaches any provision of the Contract Documents;
- .5 Anticipatorily breaches or repudiates the Contract;
- .6 Fails to make satisfactory progress in the prosecution of the Work required by the Contract; or
- .7 Endangers the performance of this Contract.

14.2.2 The Owner may terminate the Contract, in whole or in part, whenever the Owner determines that sufficient grounds for termination exist as provided in Subsection 14.2.1. The Owner will provide the Contractor with a written notice to cure the default. If the default is not cured, the termination for default is effective on the date specified in the Owner's written notice. However, if the Owner determines that default contributes to the curtailment of an essential service or poses an immediate threat to life, health, or property, the Owner may terminate the Contract immediately upon issuing oral or written notice to the Contractor without any prior notice or opportunity to cure. In addition to any other remedies provided by law or the Contract, the Contractor must compensate the Owner for additional costs that foreseeably would be incurred by the Owner, whether the costs are actually incurred or not, to obtain substitute performance. A termination for default is a termination for convenience if the termination for default is later found to be without justification.

§ 14.2.3 Upon receipt of written notice from the Owner of termination, the Contractor must:

- .1 cease operations as directed by the Owner in the notice and, if required by the Owner and County, participate in an inspection of the Work with the Owner, County and the Architect to record the extent of completion thereof, to identify the Work remaining to be completed or corrected, and to determine what temporary facilities, tools, equipment and construction machinery are to remain at the Site pending completion of the Work;

- .2 complete or correct the items directed by the Owner, and take actions necessary, or that the Owner may direct, for the protection and preservation of any stored materials and equipment and completed Work;
- .3 unless otherwise directed by the Owner, remove its tools, equipment and construction machinery from the Site, and
- .4 except as directed by the Owner, terminate all existing subcontracts and purchase orders and enter into no further subcontracts or purchase orders.

§ 14.2.4 Following written notice from the Owner of termination, the Owner may:

- .1 take possession of the Site and of all materials and equipment thereon, and at the Owner's option, such temporary facilities, tools, construction equipment and machinery thereon owned or rented by the Contractor that the Owner elects to utilize in completing the Work;
- .2 accept assignment of subcontracts and purchase orders, and
- .3 complete the Work by whatever reasonable method the Owner may deem expedient. § 14.2.5 Upon termination for cause, the Contractor must take those actions described in Section 14.2.3, and the Owner may take those actions described in Section 14.2.4, subject to the prior rights of the Contractor's Surety.

§14.2.5 If the Contractor files for protection, or a petition is filed against it, under the Bankruptcy laws, and Contractor wishes to affirm the Contract, Contractor shall immediately file with the Bankruptcy Court a motion to affirm the Contract and shall provide satisfactory evidence to Owner and to the Court of its ability to cure all present defaults and its ability to timely and successfully complete the Work. If Contractor does not make such an immediate filing, Contractor accepts that Owner shall petition the Bankruptcy Court to lift the Automatic Stay and permit Owner to terminate the Contract.

§ 14.2.6 When the Owner terminates the Contract for cause, the Contractor is not entitled to receive further payment until the Work is completed and the costs of completion have been established.

§ 14.2.7 If the unpaid balance of the Contract Sum less amounts which the Owner is entitled to offset from the unpaid Contract balance including actual or Liquidated Damages, exceeds the costs of completing the Work, including compensation for the Owner's and the Architect's services made necessary thereby, such excess will be paid to the Contractor or Surety, as directed by the Surety. If such costs exceed the unpaid Contract balance, the Contractor must pay the difference to the Owner upon written demand. This obligation for payment survives termination of the Contract.

§ 14.2.8 In completing the Work following termination for cause, the Owner is not required to solicit competitive bids or to award completion work to the lowest bidder, but may obtain such completion work and related services on the basis of sole source procurement and negotiated compensation.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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

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

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

§ 14.4.2 Upon receipt of written notice from the Owner of termination, the Contractor must:

- .1 Cease operations as directed by the Owner in the notice and, if required by the Owner, participate in an inspection of the Work with the Owner and the Architect/Engineer to record the extent of completion thereof, to identify the Work remaining to be completed or corrected, and to determine

- what temporary facilities, tools, equipment and construction machinery are to remain at the Site pending completion of the Work;
- .2 Complete or correct the items directed by the Owner, and take actions necessary, or that the Owner may direct, for the protection and preservation of any stored materials and equipment and completed Work;
 - .3 Unless otherwise directed by the Owner, remove its tools, equipment and construction machinery from the Site, and
 - .4 Except as directed by the Owner, terminate all existing subcontracts and purchase orders related to the Work and enter into no further subcontracts or purchase orders therefor.
- § 14.4.3** Following written notice from the Owner of termination, the Owner may:
- .1 Take possession of the Site and of all materials and equipment thereon, and at the Owner's option, such temporary facilities, tools, construction equipment and machinery thereon owned or rented by the Contractor that the Owner elects to utilize in completing the Work;
 - .2 Accept assignment of subcontracts and purchase orders; and
 - .3 Complete the Work by whatever reasonable method the Owner may deem expedient.

- § 14.4.4** In case of termination for the Owner's convenience, the Contractor will be entitled to compensation only for the following items:
- .1 Payment for acceptable Work performed up to the date of termination;
 - .2 The costs of preservation and protection of the Work if requested to do so by the Owner;
 - .3 The cost of terminating the following contracts including:
 1. Purchased materials but only if not returnable and provided to the Owner, or the restocking or return charge, if any, if returnable at the Owner's written election;
 - (ii.) Equipment rental contracts if not terminable at no cost but not to exceed an amount equal to thirty (30) days rental;
 - .4 Documented transportation costs associated with removing Contractor-owned equipment;
 - .5 Documented demobilization and close-out costs; and
 - .6 Overhead and profit on the foregoing not to exceed ten (10%) percent.

The Contractor will not be compensated for the cost of terminating subcontracts, which must be terminable at no cost to the Owner if the Contract is terminated. The Contractor will not be compensated for the cost of any idled employees unless the employee is under a written employment contract entitling the employee to continued employment after termination of the Contract and the employee cannot be assigned to other work provided that in all events the Contractor's costs must be limited to thirty (30) days of employment costs from the date of the notice of termination. The Contractor is not entitled to any other costs or compensation (including lost or expected profit, uncompensated overhead or related expenses, or the cost of preparing and documenting its compensable expenses under this Subsection 14.4.4 as a consequence of the Owner's termination of the Contract for convenience. The Contractor conclusively and irrevocably waives its right to any other compensation or damages (compensatory or punitive) arising from termination of the Contract. If the Owner and the Contractor are unable to agree upon the amounts specified in this subsection, the Contractor may submit a Claim as provided in Article 15. The Claim must be limited to resolution of the amounts specified in Subsections 14.4.4.1, 14.4.4.2, 14.4.4.3 and 14.4.4.4 of this Subsection 14.4.4. No other cost, damages or expenses may be claimed or paid to the Contractor or considered as part of the Claim, the same being hereby conclusively and irrevocably waived by the Contractor. Any such Claim must be delivered to the Owner within thirty (30) days of the termination of the Contract and must contain a written statement setting forth the specific reasons and supporting calculations and documentation as to the amounts the Contractor claims to be entitled to under this Subsection as a result of the termination of the Contract.

§ 14.4.5 The Contractor's obligations surviving final payment under the Contract, including without limitation those with respect to insurance, indemnification, and correction of Work that has been completed at the time of termination, remains effective notwithstanding termination for convenience of the Owner.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a written demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in

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question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Notice of circumstances that could give rise to a Claim must be given to the other party as soon as possible, to enable that party to take action as appropriate to lessen the impact of the potential Claim. The party recognizing a potential claim shall also explore all options and generate suggestions for how to avoid or overcome the impact of the circumstances. If damage cannot be avoided, claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. Claims by the Owner may be initiated at any time without relevance to the occurrence and/or recognition of the event given rise to such Claim. As a condition to making a claim for additional costs, the Contractor shall maintain and produce accurate records to substantiate all additional costs actually incurred. If a Claim for actual costs is approved, the Owner shall pay the Contractor actual costs incurred, plus overhead and profit as permitted per Section 7.3 of this Contract.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

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

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

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

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal compared to the prior 10 year weather history, could not have been reasonably anticipated or overcome by the Contractor by reasonable steps and had an adverse effect on the critical path of the construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

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

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, and 10.4, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Contract. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after

the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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

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

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

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

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

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

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

§ 15.3 MEDIATION

§ 15.3.1 Any claim, dispute or other matter in question or arising out of or related to the Contract shall be subject to mediation administered by a mediator agreed to by all parties of the Claim. Mediation is not a condition precedent to commencing litigation, but if litigation is commenced before mediation is held, the Parties agree to mediate before any dispositive motions or trial.

§ 15.3.2 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

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**SECTION 01 00 00
GENERAL REQUIREMENTS**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The General Conditions, Supplementary General Conditions and Special Conditions of this Contract shall apply to each and every contract and contractor or other person or persons supplying labor, material, equipment and/or services entering into this Project and/or on the premises directly or indirectly.
- B. Definitions:
 - 1. The word “Contractor” where used throughout this document to describe the General Contractor, shall also mean the “Construction Manager”, both Contractor and Construction Manager describing the entity holding the prime Contract for Construction.
- C. Work Included in This Contract:
 - 1. Providing all labor, materials, equipment, and services, etc., as required to properly complete all Work identified in, implied by or otherwise required by the Contract Documents.
 - 2. Should the Construction Documents disagree in themselves or with each other, the Contractor shall provide the better quality or greater quantity of work and/or materials, unless specifically otherwise directed by written Addendum to the Contract.
 - 3. The Contractor and all subcontractors shall refer to all of the Construction Documents, including those not specifically showing the Work of their specialized trades, and shall perform all work reasonably inferable from them as being necessary to produce the intended results.
- D. Work Excluded from This Contract:
 - 1. Providing equipment noted as “Not in Contract” (N.I.C.) or “By Owner,” (B.O.). The Contractor shall, however, provide services and coordination related to items not in the Contract as otherwise required or implied by the Contract Documents.

1.02 GENERAL RESPONSIBILITIES OF THE CONTRACTOR

- A. Regulations: The Contractor shall fully comply with all governing Local, State and Federal Laws, Codes, Rules, Regulations and Ordinances, including but not limited to The Americans with Disabilities Act, Equal Employment Opportunity and Affirmative Action provisions, and Occupational Safety and Health Administration provisions.
- B. Permits: The Contractor shall obtain and pay for all permits and arrange for necessary inspections and approvals from the authorities having jurisdiction. Should any changes be necessary in the Contract Documents to secure such approvals, the Contractor shall promptly notify the Architect.
 - 1. For the Owner’s records, submit copies of permits, licenses, inspection reports, certifications, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing on the Work.
- C. Coordination: The Contractor shall be fully responsible for coordinating all construction activities to assure efficient and orderly installation of each part of the Work. In general coordination duties shall include, but not be limited to verifying dimensions and existing field conditions, coordinating construction operations, establishing on-site lines of authority and communication, monitoring schedules and progress, monitoring quality, maintaining records and reports and in general assuring the proper administration of the Work.
 - 1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

2. Where installation of a component or system involves installation of component parts by multiple subcontractors, the Contractor shall inventory, store, and distribute parts to appropriate installers.
 3. Where structural, electrical, or mechanical components such as columns, ductwork, sprinkler piping, or raceways are installed in finished spaces, the intent is for room finish to enclose such components unless indicated otherwise. Coordinate between the trades and with the Architect.
 4. Where inspections or approval of a substrate or component to be concealed by another is required, coordinate construction activities and notification of Architect or inspecting party. Do not conceal substrate or component until it has been inspected and is satisfactory.
 5. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for maintenance, service, and repair.
 6. Make adequate provision to accommodate items scheduled for later installation.
 7. Coordinate completion and clean-up of Work in preparation of Substantial Completion.
 8. Special attention called toward coordination of all work in relationship to the required phasing of work to accommodate ongoing building occupation by Owner.
- D. Supervision – Construction Superintendent: The Contractor shall place and maintain a competent, experienced construction Superintendent/Foreman in charge of the Work on the job site at all times while work is in progress, including overtime operations by the Contractor's forces or by subcontractors. No changes in this position shall be made without the Owner's prior approval. The Owner shall have the right to review the qualifications of the proposed Superintendent/Foreman and ask for a replacement if in his opinion the person does not meet the qualifications that the project will demand. The same superintendent who was in charge during the general progress of the Work shall oversee the completion of all punch list items.
1. The Contractor shall be responsible for the strict enforcement of the following requirements:
 - a. All persons working on the Project site shall be required to conduct themselves in a courteous and professional manner. The use of profane language shall be strictly prohibited.
 - b. Smoking and alcoholic beverages shall be strictly prohibited on the Project site.
 - c. The use of radios, etc. shall be strictly regulated if they interfere with the Owner's ongoing building operation.
 - d. Contact with building occupants and visitors shall be minimized to the extent necessary for the safe and proper execution of the Work.
 - e. All construction personnel shall be issued identification badges by the Contractor, which shall be conspicuously displayed at all times while on the construction site.
 2. The Contractor shall designate a representative who will be available to respond to emergency calls by the Owner at any time of day and night, weekends and holidays should such a situation arise
- E. On-Site Documents: The Contractor shall provide in a visible and accessible location in the on-site office:
1. Complete, currently updated set of Specifications and Drawings, Change Orders, reviewed Shop Drawings, and other documents and samples.
 2. Permits and notifications required by laws and regulations.
 3. Standards, manuals, installation instructions, or reports required by individual Specification sections.
 4. Product MSDS Sheets.
 5. List of Owner, Owner's Representative, Architect, Architect's Consultants, Contractor's project manager, superintendent, assistant superintendent, subcontractors, building inspector, police, ambulance and fire departments; include telephone numbers and fax numbers.
- F. Accommodation and Cooperation with the Owner: The Contractor shall cooperate with the Owner to the greatest extent possible. Disruptions and inconveniences to the activities of existing facilities to remain in operation during construction shall be minimized, and shall be

subject to the prior approval of the Owner. The Contractor's cooperative efforts shall include, but shall not necessarily be limited to:

1. Maintaining fire and all other safety standards acceptable to governing authorities.
2. Protecting existing building construction, landscaping, site utilities, site improvements and features, and all other improvements within and about the project area. See Division 2 for more information.
3. Obtaining abutters' written authorization to conduct construction related activities on their properties, if required. [NOTE: The Contractor shall obtain permits and approvals required to temporarily alter or obstruct sidewalks and street(s) if required.]
4. Storing on-site materials at locations acceptable to the Owner and governing authorities.
5. Controlling construction staging, parking, and traffic and limiting it to areas acceptable to the Owner and governing authorities.
6. Providing access for and cooperating with other contractors to be employed by the Owner.
7. Providing access for and cooperating with equipment and furnishing suppliers/installers (including the Owner's own forces) to be employed by the Owner.
8. Accommodating existing occupants and other ongoing activities within and about the Project. Such accommodations shall include, but shall not necessarily be limited to:
 - a. Maintaining safe ingress and egress acceptable to the Owner and governing authorities.
 - b. Maintaining adequate heating, air conditioning, and ventilation.
 - c. Maintaining fire suppression system.
 - d. Maintaining electrical power, fire alarm, and detection systems, sound systems, clock systems, intrusion detection systems, television, computer, and telephone services.
 - e. Maintaining special systems and services such as emergency electrical power and communication systems.
 - f. Maintaining a watertight roof and exterior wall assembly.
 - g. Providing adequate dirt, dust, fume, vapor, and noise control. NOTE: The Contractor shall take special precautions to prevent the introduction of construction related dust, fumes, vapors, etc. from entering into HVAC system ducts, return air grilles, fresh air intakes, etc.)
 - 1) See Section 01 50 00 - Temporary Facilities, for additional information.
 - h. Providing temporary fire and smoke partitions acceptable to governing authorities.
 - i. Providing adequate building security in areas under the Contractor's control.
 - j. Moving and relocating existing loose furniture, equipment and supplies as required to generally accommodate the Contractor will be the responsibility of the Owner, except as otherwise indicated on the Contract Documents. The Contractor shall provide the Owner a two week written notice of such need prior.
 - k. Scheduling work within the existing facility at times acceptable to the Owner and least disruptive to ongoing activities. Existing facilities shall remain in operation during the execution of the Work of this Contract. The Contractor shall schedule, phase, and coordinate the Work as required to maintain the safe and functional use of such facilities.

G. Phasing and Work Scheduling

Prior to completing and distributing the Construction Schedule or proceeding with the Work, the Contractor shall meet with the Owner, accurately assess the Owner's requirements relative to the use of existing facilities, and schedule the Work accordingly.

1. The following shall serve as a general description of the Work Phasing Plan, developed by the Owner and Architect related to the Work of this Contract. It has been developed to accommodate Owner needs for on-going occupancy of the facility. It shall be understood that this initial Phasing Plan is subject to change made by the Owner or initiated by the Contractor and agreed to by the Owner. The providing of this plan shall not in any way limit or diminish the Contractor's responsibility for the proper scheduling and coordination of the Work.

- a. Work Phasing Plan: The General Contractor shall submit to all parties the approved Work Phasing Plan prior to the start of work. The General Contractor shall continually monitor and update the Phasing Plan as appropriate. In addition to the overall plan the General Contractor shall provide a detailed two week look ahead schedule - biweekly throughout the work of the project.
 - b. All subcontractors shall coordinate with the Contractor to determine all phasing and sequencing requirements and to schedule the Work. Work shall be executed in such a manner that shall cause minimal or no disruptions of the Owner's activities and the activities of other trades.
 - c. Coordinate project phasing to limit temporary enclosure of window openings scheduled for removal. Upon the demolition of individual existing window units the Contractor shall prepare openings to receive new window units, including but not limited to associated blocking and flashing of rough openings. New permanent windows shall be installed immediately prior to the conclusion of the same work day. Unforeseen circumstances leading to and/or openings to be concealed by curtain wall systems requiring additional installation time, such openings shall be sealed weathertight. Grade level openings and openings with direct access into the Police Department bounds shall, in addition, receive a minimum 1/2" plywood sheathing for security measures. The Contractor shall be responsible for protection of all openings during the completion of other scope of work required.
 - d. Coordinate project phasing of scope of work related to all entry/exit entrances to maintain required life safety provisions and accommodating to ongoing Owner operations. In the event such scope of work requires the temporary closure of exit(s) coordinate life safety measures and/or alternative means of address required in agreement with the Authority Having Jurisdiction and the Owner.
 - e. Coordinate the Work Phasing Plan to include temporary enclosures, scheduling of and/or other measures determined by the Contractor as necessary to ensure that the interior environment remains weathertight upon demolition of exterior fenestration assembly. All means, methods, procedures, sequences and techniques required are the sole responsibility of the Contractor
 - f. Coordinate all shut-downs, service disruptions, demolition, removals, temporary connectors, service change-overs, etc., required to avoid Owner disruption and/or inconvenience.
 - g. Coordinate all deliveries, installation, etc., as required to avoid Owner disruption and/or inconvenience.
 - h. Temporary ductwork, piping, wiring, controls, and equipment measures for essential systems such as air conditioning, ventilation, hydronic heating, domestic hot and cold water, storm drainage, sanitary sewer, controls, lighting, power, emergency systems, clocks, security, fire protection, etc. shall be provided to:
 - 1) Keep existing systems functional,
 - 2) Maintain services between existing components that must be redirected around construction areas,
 - 3) Alter, redirect, or make safe,
 - 4) Temporarily relocate equipment to facilitate phasing.
 - i. Partial and/or phased occupancy of the facility shall require systems start-ups, tests, balancing, and other similar activities to occur at the completion of each portion of the Project, instead of exclusively at the completion of the entire Project. If system adjustments cannot be properly done until completion of the entire system, interim or temporary adjustments shall be provided for proper system operation and occupant comfort in occupied areas.
 - j. See Section 01 78 10 - Warranties for requirements regarding extended warranties for equipment serving phased occupancy.
- H. Safety: The Contractor shall assume full responsibility for all means, methods, procedures, sequences and techniques of construction employed and shall take all measures required to ensure the safety of construction workers, as well as the safety of the general public. The

Contractor shall take into full consideration and assure himself that all necessary barricades, fencing, and shoring are provided and that they comply with applicable regulations and standards of good practice. The public shall be guarded from all construction hazards and/or attractive nuisances. The construction site is a part of existing occupied buildings and nearby major public thoroughfares. Therefore, site safety is of the utmost importance. The Contractor shall pay all costs necessary for temporary partitioning, barricading, fencing, shoring, walks, ramps, enclosures, flashing lights, warning signs, security and safety devices required for the maintenance of a clean and safe construction site.

1. Owner's Safety Policies: Prior to the commencement of construction, the Contractor shall thoroughly review the Owner's facility and occupant safety policies and procedures and shall inform all construction workers of their related responsibilities. Should the Contractor take exception to any of the Owner's policies and procedures, he shall so notify the Owner and Architect, in writing, prior to proceeding with the Work. The failure to provide such notification shall be construed as full acceptance of the Owner's policies and procedures.
 2. MSDS Sheets: The Contractor shall furnish copies of Material Safety Data Sheets to the Owner for all materials classified as hazardous or poisonous. MSDS for all materials shall be maintained with the Contractor in a file on-site.
 3. The Contractor shall cooperate with and maintain a designated point of contact liaison with the Portsmouth Police Department, Portsmouth Fire Department and the Portsmouth Department of Public Works and he/she shall abide by safety or security related requests from any of these authorities.
- I. Indoor Air Quality Management:
1. The Contractor and his various subcontractors as he may direct shall implement procedures throughout construction in an effort to improve indoor air quality during the Owner's occupancy. See Section 01 57 21- Indoor Air Quality Controls.
 2. The maintenance of a clean, dust-free environment in areas of the facility that remain operational or otherwise accessible to non-construction personnel shall be the shared responsibility of all construction personnel.
 3. Control of dust, vapors, odors, and the spread of fire shall be considered of paramount importance. Unless otherwise specifically required by the Owner, the means and methods of achieving such control shall remain the exclusive responsibility of the Contractor, and not the Owner or Architect. However, the following may be considered:
 - a. Fire-resistant plastic dust barriers. (Including above suspended ceilings. Provide ante rooms and gasketed doors where appropriate.)
 - b. Construction of non-combustible partitions and enclosures.
 - c. Negative pressure containment.
 - d. Duct tape and sealant.
 - e. Walk-off mats (adhesive treated).
 - f. Vacuuming (with HEPA filtered vacuum).
 - g. Closure of air intake vents (verify need for service prior to interruption).
 4. The Contractor and his various subcontractors as he may direct shall implement the following procedures in an effort to improve indoor air quality during the Owner's occupancy:
 - a. All adhesives (for construction, floor and wall coverings, etc.), paints, thinners, solvents, etc. shall, among other technical qualifications, be selected in consideration of minimizing their potential contribution to indoor air pollution.
 - b. Provide maximum all-outside-air ventilation during the installation of strong emitting materials. This shall be done for the purpose of reducing the contamination of other materials by absorption of solvents and other volatile components.
 - c. On projects where the Owner (or other user) occupies all or portions of the building during construction, the Contractor shall make every practical effort to minimize their exposure to fumes and dust from construction. Such efforts shall include items 1 through 3 above, as well as the construction of temporary air-tight barriers,

maintaining negative air pressure in work areas, isolation of ventilation systems and all other appropriate means as determined by the Contractor.

- J. Environmental Regulations: The Contractor shall comply with all applicable environmental laws and regulations. Particular attention shall be paid to proper dust, fume and vapor control throughout the building and site.
- K. Hazardous Substances: The Architect's Scope of Services and responsibilities exclude the investigation, discovery, detection, identification, presence, leakage, release, use, handling, disposal, encapsulation, abatement, treatment, or removal of, or exposure of a person or persons to hazardous materials, pollutants, contaminants, or disease transmitting organisms, pre-existing or otherwise deposited in any form at the project, indoors or outdoors, at any time before, during or after construction, including but not limited to volatile organic compounds, petroleum products, bacteria, molds, fungus, asbestos or asbestos products, lead, radon, electro-magnetic frequency radiation or other radiation. Should any such substances be encountered, the Owner and Architect shall be promptly notified, in writing.
- L. Layout and Field Engineering: The Contractor shall be responsible for all layout of all Work, even if such layout is done by others. The Contractor shall employ a qualified field engineer or land surveyor to determine all lines and grades and to field verify existing job conditions and measurements indicated on the Drawings. The Contractor's responsibility includes but is not necessarily limited to levels, control points, base lines, on-site bench marks, reference points, siting of building and other improvements, locations of components, fixtures, equipment, finishes, site improvements, etc.
 - 1. The Contractor shall be responsible to submit a certificate signed by land surveyor registered in the State of New Hampshire, hired by the Contractor, certifying that the location of new building lines and location and elevation of improvements comply with the Contract Documents.
 - a. The Contractor shall submit in writing, to the Owner, the name of the survey firm used, address, and registration number of such person or persons.
 - 2. The Owner has generally identified on the existing conditions survey, existing topography, utilities, wetlands, control points, and property line corner stakes.
 - 3. The Contractor shall provide to the Architect written documentation to verify all layout. Include any deviations from the Contract Documents. Do not start any Work affected by such deviations until reviewed by the Architect.
 - a. Upon request by the Owner, the Contractor shall make available to the Owner survey instruments necessary to check the proposed vertical and horizontal alignments at no additional costs.
 - 4. The Contractor shall be responsible for costs of survey work including but not necessarily limited to establishing and protecting on-site benchmarks, replacement or relocation of bench marks, additional base lines or levels, reference points, location of site improvements, verification of existing building dimensions, layout and floor elevations. All discrepancies shall be reported to the Architect for clarification.
 - 5. The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction. Verify the location and invert elevation at point of connection of sanitary sewer, storm drainage, and water service piping, etc.
 - 6. The Contractor shall maintain a surveyor's log of control and other survey work. Record deviations from required lines, and level, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
 - 7. The Contractor shall carefully examine all buildings, sites, and Contract Documents prior to submitting his Bid and satisfy himself as to the conditions under which he must operate to perform the Work. No additional compensation will be made to the Contractor for any error or negligence on his part, nor for discrepancies between actual conditions found at the buildings and sites and as indicated in the Contract Documents, unless such

discrepancies are brought to the attention of the Architect by a Bidder or Sub-Bidder, in writing, prior to the opening of Bids.

- M. Visual Recording: Prior to the start of construction, the Contractor shall make a color DVD recording along the entire work area. One complete recording shall be submitted to both the Owner prior to start of construction. The visual recording shall be identified as "Facade Replacement & Addition - Portsmouth City Hall Existing Conditions". Recording shall be time and date stamped.
- N. Protection of Adjoining Property: The Contractor shall provide all shoring, fencing, and other work necessary to support, protect and keep unharmed all walls, footings, floors, roofs, walks, roadways and all other parts of any existing buildings, facilities, site improvements, land forms, trees and plant materials, etc. The Contractor shall hold the Owner and Architect harmless from any such damage due to any operations under this Contract. Any existing work or property damaged or disrupted as a result of this Contract shall be replaced or repaired to match original existing conditions at no additional cost to the Owner.
- O. Utilities: The Contractor shall send proper notices, make all necessary arrangements and perform all other services required for the removal or the care, protection and maintenance of all utilities, including, but not limited to, fire plugs (hydrants), electric, gas, water, sewer, alarm, television, telephone, computer, and telegraph poles and wires, and all other items of this character above or below the ground, on and around the building site, assuming all responsibility and paying all costs related thereto. Related services to any existing facilities shall not be disrupted without the prior approval of the Owner, and then only to the minimum extent required. The Contractor shall comply with the "Underground Utility Damage Prevention System" by notification to DIG SAFE SYSTEM of intent to excavate near or around any underground utility installations. The Contractor shall call DIG SAFE SYSTEM at least 72 working day hours in advance of starting any such excavation.
- P. Traffic Regulations and Parking: The Contractor shall properly regulate traffic at times when the Work interferes with the normal flow of traffic both on and off the site. Parking for workers and/or closure of drives and access lanes on the project shall be limited to areas designated of within schedules agreed to by the Owner and/or governing officials. Roadways and driveways outside the limits of the Contract shall be kept free of debris resulting from construction related traffic.
- Q. Roads and Access to the Site: Access to the site for workers and the delivery or removal of construction materials and/or equipment shall be made only from locations approved by governing authorities and acceptable to the Owner. Existing roads, lanes and other required fire access shall remain accessible to fire vehicles at all times. Hauling permits and route approvals shall be obtained from governing authorities as applicable.
- R. Security: The Contractor shall be responsible for the securing of new and existing structures against the entry of unauthorized persons at all times, including nights, holidays and days when the buildings may be unoccupied.
 - 1. When construction related personnel are the last to leave either the new or existing facilities, they shall verify that the entire building perimeter is properly secured.
 - 2. When non-construction related personnel are the last to leave either the new or existing facilities, the Contractor shall verify that all unoccupied areas are properly secured, and shall record the names and affiliations of those persons remaining in the facilities.
- S. Fire Protection: The Contractor shall maintain existing life safety systems in operation and use. Where new systems, replacement of system components and/or extensions of systems are required the new system shall be installed and ready for activation prior to disruption of service. Do not interrupt existing life safety system service without written approval by both the Owner and Authority Having Jurisdiction.
- T. Dewatering: The Contractor shall protect the Work, including but not limited to all excavations, trenches, buildings and materials from storm water, ground water, back-up or leakage of sewers, drains or other piping, and from water of any other origin and shall control, collect and dispose of any accumulation of such water.

1. Dewatering operations shall include, but not be limited to:
 - a. Furnishing, operating, and maintaining all pumps, piping, drains, and other equipment, including spare units available for immediate use in the event of equipment breakdowns.
 - b. Designing, engineering, constructing, maintaining and removing cofferdams, temporary underdrains, wellpoints and all other systems necessary for dewatering.
 - c. Disposing of all water in a safe and proper manner, acceptable to governing authorities.
 2. The Contractor shall pay all costs related to dewatering. All damage resulting from dewatering operations, or the failure of the Contractor to maintain the Work in a suitable dry condition, shall be promptly repaired by the Contractor at no additional cost to the Owner.
- U. Snow Removal: The Contractor shall remove all snow or ice which might result in damage or delay to the Work.
- V. Vandalism: The Contractor shall take all reasonable precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner, whether or not forming part of the Work, located within those areas of the Project to which the Contractor has access.
- W. Existing Materials and Equipment: See Section 01 60 00 - Product Requirements.
- X. Shipping and Storage of Materials: See Section 01 60 00 - Product Requirements.
- Y. Owner Furnished Equipment: See Section 01 60 00 - Product Requirements.
- Z. Watertight Structure: The Contract Documents are not intended to depict each and every condition or detail of construction. As the knowledgeable party in the field, the Contractor is in the best position to verify that all construction is completed in a manner that will provide a watertight structure during construction (i.e. as needed to keep all interior construction dry both during and following its installation) and upon completion of construction. The Contractor shall be solely responsible for ensuring the watertight integrity of the structure.
- AA. Guarantee: The Contractor shall guarantee the entire Work to be free from defective or improper work or materials, and shall make good any damage due to such work or materials for a term of one year from the date of the satisfactory completion and acceptance of the Work. See Section 01 78 10 - Warranties.

1.03 MEASUREMENT AND PAYMENT

- A. Schedule of Values: Submit a preliminary sample of the Schedule of Values for review and comment regarding format and content to the Architect at the earliest feasible date, but in no case later than fourteen (14) days prior to submittal of the first Application for Payment. The Schedule of Values shall clearly identify the cost of the Work by trade, plus all General Conditions, Allowances, and accepted Alternates.
1. Separate Schedules of Values shall be prepared for each phase of the Work.
 2. The format and general content of such schedule shall be acceptable to the Owner and Architect.
 - a. Round amount off to the nearest whole dollar; the total shall equal the Contract Sum.
 - b. No later than seven (7) days prior to submittal of the first Application for Payment, the Contractor shall submit to the Architect and Owner, the fully completed Schedule of Values.
- B. Payment Requisition: The Contractor shall submit to the Architect three original copies of "Application for Payment", AIA Forms G702 and G703, an itemized statement showing the original Contract Amount, the value of the Work to date, the amount previously approved, the amount presently requested and the balance remaining. Each copy shall be fully executed and properly signed and sealed.
1. Application for Payment entries shall match the Schedule of Values. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.

2. Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and paid for by the Owner.
3. Progress payment dates shall be as established elsewhere in the Agreement. The Contractor shall submit a draft of the Application for Payment to the Architect sufficiently in advance of but in no case less than two weeks prior the due date to the Architect to allow for preliminary review and adjustments. The Contractor at his/her discretion may opt within the draft Payment Requisition to project the two week preliminary review period. At the time of the due date the Architect shall review the value of work completed to be in general conformance with the value of the Payment Requisition.
4. The Contractor shall clearly differentiate between items stored on-site and items stored off-site. For off-site stored materials, provide invoices, list of materials, insurance certificate, right of entry, transfer of title, and other documents as may be required by the Architect and Owner.
5. Provide invoices, vouchers, time sheets, and other documents as may be required by the Architect to verify labor and materials costs.
6. Each Application for Payment shall be accompanied by a transmittal listing all attachments.
7. Initial Application for Payment: The following administrative actions and submittals shall precede or coincide with the submittal of the first Application for Payment:
 - a. List of subcontractors, principal suppliers, and fabricators.
 - b. Schedule of Values.
 - c. Contractor's Construction Schedule (preliminary, if not final).
 - d. Contractor's Submittal Schedule (preliminary, if not final).
 - e. List of Contractor's staff assignments.
 - f. Copies of building permits, authorizations, and licenses from governing authorities.
 - g. Certificates of insurance.
 - h. Data needed to acquire Owner's insurance.
 - i. Initial Progress Report.
 - j. Performance and Payment Bonds, if applicable.
8. Application for Payment at Substantial Completion: Submit an Application for Payment following issuance of the Certificate of Substantial Completion. The application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. See AIA 201 General Conditions of the Contract. The following administrative actions and submittals shall precede or coincide with the submittal of this Application for Payment:
 - a. Occupancy permits, as applicable.
 - b. Warranties and maintenance agreements.
 - c. Testing / adjusting / balancing reports.
 - d. Maintenance instructions.
 - e. Meter readings, as applicable.
 - f. Start-up performance reports.
 - g. Change-over information related to Owner's occupancy, use operation and maintenance.
 - h. Final cleaning.
 - i. Application for reduction of retainage, and consent of surety.
 - j. Advice on shifting insurance coverage.
 - k. List of incomplete Work, recognized as exception to the Architect's Certificate of Substantial Completion, if any.
9. Final Application for Payment: This application shall reflect any Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work. See Article regarding Final Payment of the Agreement and AIA 201 General Conditions of the Contract. The following administrative actions and submittals shall precede or coincide with the submittal of the final Application for Payment:
 - a. All items required by Article 9 "Payments & Completion" of AIA A201.
 - b. Completion of Project close-out requirements.

- c. Completion of items specified for completion after Substantial Completion.
 - d. Assurance that unsettled claims will be settled.
 - e. Transmittal of required Project construction records, including Record Drawings to the Owner.
 - f. Proof that taxes, fees and similar obligations have been paid.
 - g. Removal of temporary facilities and services.
 - h. Removal of surplus materials, rubbish, and similar elements.
- C. Waivers of Mechanics Lien: With each Application for Payment, submit waivers of mechanics lien for every entity who is lawfully entitled to file a lien arising out the Contract and related to the Work covered by the Payment. See AIA A201 General Conditions of the Contract.
1. The Contractor shall promptly execute a partial waiver of mechanics lien for the period of construction covered by each application. Executed waivers shall be submitted to the Architect with the submittal of the next Application for Payment by the Contractor. With each Application for Payment, submit partial waiver of mechanics liens from subcontractors, or sub-subcontractors and suppliers for the construction period covered by the previous application.
 2. When an application shows completion of an item, submit final or full waivers when retainage is released.
 3. The Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit the final Application for Payment with or preceded by final waivers from every entity involved with the performance of the Work covered by the application who could lawfully be entitled to a lien. The total amount of each entity's final waiver of lien shall equal the Contact Sum for that entity including all additions and reductions thereto.
 5. Submit waiver of liens on the following forms, and executed in a manner, acceptable to the Owner:
 - a. Partial waiver of liens: Form provided by the Contractor and acceptable to the Architect and Owner.
 - b. Final waiver of liens: AIA G706A Contractor's Affidavit of Payment of Release of Liens or another form acceptable to the Architect and Owner.
- D. Schedule Update: Along with each payment requisition, the Contractor shall submit construction photographs and a report on the status of the next month's construction schedule. Each such monthly report shall update the progress of the Work and shall identify:
1. Areas of the building and site expected to be worked on during the next month.
 - a. The monthly schedule indicated herein is in addition to the biweekly outlook schedule required by the Contractor to be provided to the Architect and Owner at the typical Job Meetings.
 2. Special conditions or circumstances that may affect the safe use of the building or site.

1.04 MODIFICATION PROCEDURES

- A. Minor Changes to the Work: Supplemental Instructions, authorizing minor changes in the Work, not involving an adjustment to the Contract Sum or Contract Time, may be issued by the Architect.
- B. Architect / Owner Initiated Change Order Proposal Requests: The Architect shall issue Proposal Requests that describe proposed changes in the Work that may require adjustment to the Contract Sum and/or Contract Time. The Architect will provide supplemental sketches or revised Drawings and Specifications as necessary.
1. Proposal requests are for information only. Do not consider them an instruction either to stop work in progress, or to execute the proposed change.
 2. Unless otherwise indicated in the proposal request, within ten working days of receipt of the proposal request, the Contractor shall submit to the Architect and Owner for review, an estimate of cost necessary to execute the proposed change. Include an itemization of quantities, unit costs, etc. Include all related charges and a statement indicating the effect the proposed change will have on the Contract Time.

- C. Contractor Initiated Change Order Proposal Requests: The Contractor may propose changes when latent or other unforeseen conditions require modifications to the Contract, by submitting a request for a change to the Architect.
 - 1. Provide a complete description of the proposed change. Indicate the reason for the change and the effect of the change on the Work, the Contract Sum and the Contract Time. Include an itemization of quantities, unit costs, etc. and include all related charges. Comply with requirements for “Substitutions”.
- D. Allowances: See Section 01 21 00 - Allowances. For allowance cost adjustment, base Change Order Proposal on the difference between the actual purchase amount and the allowance, multiplied by the measurement for work-in-place. Submit substantiation of all changes in Work claimed in the Change Orders. The Owner reserves the right to establish the actual quantity of work-in-place by independent quantity survey, measure, or count.
 - 1. No change to the Contractor’s indirect expense is permitted for selection of higher or lower priced materials or systems of the same scope and nature as originally indicated. A change in the Contractor’s indirect expense will only be allowed when it is clearly demonstrated that either the nature or scope of the Work was changed from that which could be foreseen from the description of the allowance and other information in the Contract Documents.
- E. Construction Change Directive: Construction Change Directives, containing descriptions of changes in the Work and designating methods to be followed to determine changes in the Contract Sum and/or Contract Time may be issued by the Architect.
 - 1. Maintain detailed records of time and materials related to the Work required by the Construction Change Directive. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
- F. Change Order Procedures: Upon the Owner’s approval of a Change Order Proposal Request, the Architect will issue a Change Order for signatures of the Contractor, PW Director, City Finance and City Manager, (5) copies to be provided.

1.05 SUBSTITUTIONS

- A. Substitutions are changes, modifications or deviations in those products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after the receipt of Bids. Substitutions for the convenience of the Contract or subcontractors, or materials suppliers will only be considered if submitted prior to the receipt of Bids, in strict conformance with the Instructions to Sub-bidders.. The following shall not be considered substitutions:
 - 1. Changes, modifications, or deviations requested by Bidders during the bidding period and accepted prior to the receipt of Bids shall be considered as included in the Contract Documents and are not subject to the requirements of this Section.
 - 2. Revisions to Contract Documents requested by the Owner or Architect.
 - 3. Specified options of products or materials included in the Contract Documents.
 - 4. The Contractor’s compliance with governing regulations and orders issued by governing authorities, subject to the Architect’s prior written notice and approval.
- B. Substitution Requests: See Section 01 60 00 - Product Requirements, for substitution request procedures.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for requirements regarding submission of:
 - 1. Outline Construction Schedule.
 - 2. Comprehensive Construction Schedule.
 - 3. Schedule of Materials.
 - 4. Schedule of Submittals.
 - 5. Shop Drawings, Product Data and Samples.
 - 6. Mock-ups and Sample Field Installations.

7. Requests for Substitution

1.07 ELECTRONIC MEDIA

- A. Electronic Media: See Section 01 00 30 - Electronic Media, for information regarding obtaining the Contract Documents electronically and their limited use for purposes of project coordination, Contractor's use in the preparation of submittals, and Contractor's use in the preparation of Record Drawings.

1.08 QUALITY CONTROL

- A. General: The Owner shall employ an independent testing agency for the purpose of testing and inspecting portions of the Work in progress. The Contractor and his various subcontractors shall be responsible for specific testing and inspections as identified in individual specification sections. See Section 01 40 00 - Quality Requirements

1.09 TEMPORARY FACILITIES

- A. See Section 01 50 00 - Temporary Facilities and Controls, for information regarding:
1. Field offices and storage sheds.
 2. Project signs.
 3. Temporary utilities.
 4. Temporary stairs, hoists, and lifts.
 5. Temporary enclosures and heat.
 6. Sanitary facilities.
 7. Temporary protective covering of finished work.
 8. Temporary protection of existing facilities.
 9. Temporary fencing.
 10. Temporary fire protection.
 11. Temporary drainage and storm water control.
 12. Temporary parking and roads.
 13. Clean-up and waste removal.

1.10 PROJECT MEETINGS

- A. The Contractor shall schedule the following project meetings including but not limited to:
1. Pre-Construction Meeting.
 2. Pre-Installation Meetings.
 3. Coordination Meetings.
 4. Job Meetings.
 5. Project Close-out Meeting.
 6. Other meetings as necessary.
- B. Pre-Construction Meeting: The Contractor shall conduct an initial organization meeting at the Project site or other convenient location after the Notice to Proceed and prior to commencement of construction activities. The Owner, Architect, Owner's Representative, Contractor, his Superintendent, major subcontractors, and other concerned parties shall each be represented at the meeting by persons familiar with and authorized to conclude matters related to the Work. The Contractor shall record the minutes of this meeting. The minutes shall be distributed promptly to all participants.
1. Agenda items shall include, but not be limited to:
 - a. Notice to Proceed
 - b. Designation of personnel representing the parties and their responsibilities.
 - 1) Emergency Contacts
 - c. Contract Documents: on-site documents, discrepancies or omissions, interpretations and clarifications.
 - d. Subcontractors
 - e. Schedule of Values
 - f. Insurance requirements.
 - g. Application for Payment: progress payments, Substantial Completion, off-site stored materials.

- h. Project meetings.
 - i. Layout.
 - j. Scheduling: Construction schedule, working hours, overtime, holidays.
 - k. Permits and regulations
 - l. Testing and inspections.
 - m. Submittals: schedule, process, shop drawings, samples, record documents.
 - n. Substitutions.
 - o. Changes.
 - p. Job responsibilities: Superintendent, Owner's Representative.
 - q. Temporary facilities: parking, staging areas, site security, water, power, clean-up
 - r. Job safety.
- C. Pre-Installation Meetings: The Contractor shall conduct pre-installation meetings before each major construction activity that requires coordination is begun. Attendees may include the Contractor, Superintendent, Owner's Representative, Architect, Installers, Manufacturer's representatives, and fabricators. Refer to individual Specification Sections for required pre-installation meetings. Review progress of other construction activities and preparation for the particular activity under consideration.
- D. Coordination Meetings: The Contractor shall conduct coordination meetings at regularly scheduled times convenient to all parties. All major subcontractors shall be represented and other trades or subcontractors as required for coordination, planning and scheduling construction activities. The Contractor shall bring any significant issues to the next Job Meeting.
- E. Job Meetings: The Contractor shall conduct regular job meetings once every two weeks during the construction period, at such time as is mutually acceptable to the Owner, Architect and Contractor. All major subcontractors shall be represented at each meeting as needed. Other trades or subcontractors may be called to particular job meetings as the progress of the Work requires. The Contractor shall record the minutes of each meeting. The minutes shall be distributed promptly to all participants.
- 1. Agenda items shall include, but not be limited to:
 - a. Review construction progress since the last meeting.
 - b. Review work progress in relation to the Construction Schedule.
 - c. Review two week look ahead work schedule forecast.
 - d. Review "Old Business" and new items significant to the Work.
 - e. Review issues regarding construction activities and Owner's on-going occupancy.
 - f. Review work sequence, deliveries, hazards, quality standards, housekeeping, security, etc.
 - g. Review Change Orders, Proposal Requests, Requests for Information, Supplemental Instructions.
 - h. The Contractor will distribute updated Construction Schedule once per month.
- F. Project Close-out Meeting: See Section 01 78 00 - Project Close-out.

1.11 WARRANTIES

- A. See Section 01 78 10 - Warranties, for requirements regarding submission of a bound set of warranties and certificates as required by the Contract Documents.

1.12 PROJECT CLOSE-OUT

- A. See Section 01 78 00 - Project Close-out, for requirements regarding:
- 1. Substantial Completion procedures, including Project Close-out Meeting and Occupancy Permit.
 - 2. Architect's evaluation of the Work.
 - 3. Final Acceptance procedures.
 - 4. Project record documents submittal, including O&M manuals, warranties binder, record photographs, and record drawings.
 - 5. Spare parts and extra materials procedures.

6. Indoor Air Quality Management, building commissioning and systems testing.
 7. Operating and maintenance instructional sessions.
 8. Final cleaning.
 9. Contractor's Certificate of No Hazardous Materials.
 - a. Testing agency final report.
- B. Occupation by the Owner: The Owner shall have the right to take possession of and use any completed or partially completed portions of the Work, notwithstanding the fact that the time for completing the entire Work or such portions thereof may not have expired; but such possession and use shall not be an acceptance of the Work.

1.13 TIME FOR COMPLETION AND LIQUIDATED DAMAGES

- A. Time is of the essence of the Contract, and the Work to be performed under the Contract shall be commenced on or before **June 5, 2017**, and shall be Substantially Complete and in receipt of an Occupancy Permit on or before **June 1, 2018**.
- B. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for completion of the Work described herein is reasonable for the completion of same, taking into consideration the climatic and industrial conditions prevailing in this locality.
- C. From the compensation otherwise to be paid, the Owner may retain the sum of Three Hundred Dollars (\$ 300) per calendar day, after the expiration of the above date, that the Work under the Contract remains incomplete or unacceptable to the Architect or Owner. Such sum shall be agreed upon as the proper measure of liquidated damages which the Owner will sustain per diem by failure of the Contractor to complete the Work within the agreed upon number of calendar days, and this sum shall not be construed as in any sense a penalty.
 1. (NOTE: Should the proposed construction start date be postponed, through no fault of the Contractor, the date of Substantial Completion shall be equitably adjusted.)

END OF SECTION

**SECTION 01 00 30
ELECTRONIC MEDIA**

PART 1 - GENERAL

1.01 DESCRIPTION

- A. The provisions of this Section apply to each and every contract and contractor or other person or persons supplying labor, material, equipment and/or services entering into this Project and/or on the premises directly or indirectly.
- B. Following the receipt of a written request by the Contractor, signed Electronic Data Transfer and Non-Disclosure Agreement, and if applicable, payment in full from the Contractor, the Architect will make available an electronic data version of the Project, for the limited purposes described in this Agreement. It shall be the Contractor's responsibility to make electronic files available to subcontractors in accordance with the Electronic Data Transfer and Non-Disclosure Agreement.

ELECTRONIC DATA TRANSFER AND NON-DISCLOSURE AGREEMENT

The Agreement is entered into and agreed by, between and among Lavallee Brensinger Professional Association (LBA) , and TO BE DETERMINED (Recipient) and is made in reference to the FACADE REPLACEMENT & ADDITION - PORTSMOUTH CITY HALL, 1 Junkins Avenue, Portsmouth, New Hampshire Project. It is understood and agreed that it may become desirable for LBA to make certain Instruments of Service in electronic machine readable format, hereinafter referred to as "Electronic Data" available to other parties related to the Project. It is also understood that such information is proprietary to LBA and that LBA intends to limit its distribution and use. It is the intent of the Agreement to govern all circumstances under which Electronic Data is made available by LBA.

In consideration of the request of TO BE DETERMINED (Recipient) to LBA to deliver to Recipient or otherwise enable the Recipient to access certain Electronic Data for use on the Project, the parties mutually agree as follows:

1. Electronic Data includes but is not limited to, computer-aided design files including native file formats (DWG), Building Information Models (BIM), files produced by word processing, spread sheet, scheduling, data base and other software programs. Computer-Aided-Design files shall be provided as Autocad .dwg files. Building Information Models shall be provided as Revit .rvt files.
2. The means by which the Electronic Data is transferred may include, but are not limited to, electronic mail, File Transfer Protocol sites and CD-Rom, transmitted between the parties in this Agreement. Recipient acknowledges that Electronic Data transferred in any manner or translated from the system and format used by LBA to an alternate system or format is subject to errors that may affect the accuracy and reliability of the data and that the data may be altered, whether inadvertently or otherwise. Accordingly, LBA makes no warranty, express or implied, as to the correctness, accuracy, and/or completeness of the information transferred. Although LBA may issue information throughout the development of the Project, LBA does not represent that the information provided includes all revisions to-date, nor shall LBA assume any responsibility for providing updated information as the Project proceeds.
3. LBA reserves the right to retain hard copy originals in addition to electronic copies of the Electronic Data transferred, which originals shall be referred to and shall govern in the event of any inconsistency with the transferred data. Should the recipient discover errors or conflicts in any transferred files, he shall promptly notify LBA.

4. As consideration to LBA for the transfer of the Electronic Data, Recipient agrees that the use of Electronic Data shall be entirely at his/her own risk, and that LBA shall not be liable for, and Recipient hereby waives all claims and agrees to indemnify and hold LBA harmless from all liabilities, claims, losses, damages or expenses (including attorneys' fees) arising out of, or connected with: (1) the transfer of Electronic Data by any means; or (2) the use, modification or misuse of the Electronic Data by parties other than LBA; or (3) the limited life expectancy and decline of accuracy or readability of the Electronic Data due to storage; or (4) translation and data errors; or (5) any use of the Electronic Data by any third parties receiving the data from other parties to this Agreement; or (6) the incompatibility of software or hardware used by LBA and the other parties to this Agreement.

5. The Electronic Data provided by LBA under the terms of this Agreement is the proprietary information of LBA, containing designs, details, model elements and other information developed by LBA. LBA is willing to supply such information only if the Recipient enters into this Non-Disclosure Agreement and agrees to strictly enforce its terms and conditions. All Electronic Data is to be treated as confidential and is not to be disclosed to or shared with any third parties, not expressly allowed herein, without LBA's express, written consent.

6. Recipient agrees to maintain and protect any and all proprietary information of LBA and to exercise great care in the preservation of its confidentiality. The Recipient will disclose the proprietary information only to its own employees, and then only to the extent required for the design and construction of this Project. The Recipient shall be responsible for any unauthorized use or disclosure of LBA's proprietary information by anyone to whom it may disclose such information.

7. The Recipient agrees that any and all Electronic Data shall remain the property of LBA. Neither the execution of this Agreement, nor the transfer of Electronic Data shall constitute a conveyance or transfer to the Recipient of any right, interest, or license in the proprietary materials. The Recipient shall not reproduce any proprietary information without the express written authorization of LBA.

8. Electronic Data are provided as a convenience to the Recipient for informational purposes only in connection with the Recipient's performance of its responsibilities and obligations relating to the Project. The Electronic Data do not replace or supplement the paper copies of the Drawings and Specifications which are and remain, the Contract Documents for the Project.

9. Electronic Data shall only be used for purposes allowable by this Agreement. It is understood and agreed that, without the separate express written permission of LBA to do so, the Electronic Data are not to be used for any purpose whatsoever, by anyone (any contractor or any of its subcontractors of any tier or any materials supplier or vendor) other than the Recipient. It shall be the responsibility of the Recipient to notify LBA of any and all third parties with whom the Recipient wishes to share LBA's Electronic Data, to identify the intended uses of the information, and to obtain LBA's prior written authorization to share LBA's information.

10. All transmittal of Electronic Data whether by CD-Rom, e-mail, Internet or any other methods shall require that the file name, size, date and time be recorded along with the date and time of transmission (if by electronic means) and the identity of the sender and recipient.

11. The Recipient further agrees to indemnify and save harmless LBA and its sub-consultant and each of their partners, officers, shareholders, directors and employees from any and all claims, judgments, suits, liabilities, damages, costs or expenses (including reasonable defense and attorneys' fees) arising as the result of either: 1) Recipient's failure to comply with any of the requirements of the Electronic Data Transfer Agreement; or 2) a defect, error or omission in the Electronic Data or the information contained therein, which defect error or omission was not contained in the Contact Documents as defined in paragraph 3 or where the use of such Contact Documents would have prevented the claim, judgment, suit, liability, damage, cost or expense.

12. This agreement shall be interpreted under the laws of the State of New Hampshire. The Recipient hereby agrees that the breach of this Agreement by the Recipient will cause LBA considerable harm, and LBA shall be entitled to recover damages, as well as all expenses and costs incurred by LBA arising out of or related to such breach, including, without limitation, reasonable attorney's fees and costs.

13. In general, the protocols for the distribution of Electronic Data shall be as follows:
- a. LBA may make certain Electronic Data available to TO BE DETERMINED (Recipient - MUST be Owner, Construction Manager or General Contractor) free of charge, providing that:
 - 1) Such files can be issued in the format currently used by LBA, without modification.
 - 2) The Recipient delivers to LBA a fully executed copy of this Agreement and, among other requirements, agrees not to share LBA's Electronic Data with any third parties without LBA's prior written authorization.
 - b. In the event the Recipient wishes to share LBA's Electronic Data with a third party:
 - 1) The Recipient shall first forward a complete list of all such third parties to LBA for LBA's prior written authorization. The list shall include all third party names, addresses, telephone numbers, and email addresses.
 - 2) Each individual third party shall then deliver, through the Recipient, a fully executed copy of this Agreement.
 - c. In the event that it is necessary for LBA to convert files from its currently used format of REVIT to an alternative format, LBA shall be compensated for such conversion at the rate of \$75.00 per file, payable in advance.

The parties have executed this Agreement as of the dates stated below:

RECIPIENT
Company: _____
By: _____
Title: _____
Date: _____

LBA
Title: _____
Date: _____

END OF SECTION

SECTION 01 21 00
ALLOWANCES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Cash Lump Sum and Unit Cost allowances.
- B. Inspecting and testing allowances.

1.02 RELATED REQUIREMENTS

- A. Section 01 00 00 - General Requirements: Additional payment and modification procedures.

1.03 CASH ALLOWANCES

- A. Types of allowances required include Lump Sum allowances and Unit Cost allowances.
- B. All Allowances under this Section shall be included in the Base Bid and shall be carried by the Contractor, unless specifically indicated to be carried by a subcontractor.
- C. The Contract shall cause the work covered by these Allowances to be performed for such amounts and by such persons as the Owner may direct, but he will not be required to employ persons against whom he makes a reasonable objection.
- D. Costs Included in Cash Allowances: Cost of product to the Contractor or subcontractor, less applicable trade discounts, and other costs, if any, specifically included in the description of the Allowance.
- E. Costs Not Included in Cash Allowances: Product delivery to site and handling at the site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing, unless specifically included in the description of the Allowance.
- F. Refer to related Drawings and Specifications for additional information regarding Work to be included as a part of Allowances.
- G. Architect Responsibilities:
 - 1. Consult with Contractor for consideration and selection of products , suppliers , and installers.
 - 2. Select products in consultation with Owner and transmit decision to Contractor.
 - 3. Prepare Change Order.
- H. Contractor Responsibilities:
 - 1. At the earliest practical date after award of the Contract, advise the Architect of the date when selection and purchase of each product or system described by an Allowance must be completed to avoid delaying the Work.
 - 2. Assist Architect in selection of products . Where services, products and/or systems are selected by the Owner, purchase such items from the designated supplier.
 - 3. Obtain proposals from suppliers and installers for use in making final selections and offer recommendations.
 - 4. On notification of which products have been selected, execute purchase agreement with designated supplier and installer.
 - 5. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
 - 6. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.
 - 7. Submit invoices or delivery slips to show quantities of materials delivered to the site for use in fulfilling each allowance.
 - 8. Cost monitoring:
 - a. Monitor progress of Allowance costs and expenditures and regularly report to the Architect and Owner.

- b. Provide written advance notice to Architect and Owner if Allowance is likely to be exceeded.
 - c. Obtain Owner's written authorization prior to incurring costs in excess of the stated Allowance.
 - d. The Contractor shall assume responsibility for all costs in excess of the stated Allowance with failure to perform the above cost monitoring procedures.
- I. If the cost, when determined, is more than or less than the Allowance, the Contract Sum shall be adjusted accordingly by Change Order, which will include additional or reduced handling costs on the site, labor, installation costs, overhead, profit and other expenses resulting to the Contractor for any increase over or decrease from the original Allowance.

PART 2 - ALLOWANCES

2.01 INSPECTING AND TESTING ALLOWANCE

- A. Allow the sum of \$ TO BE DETERMINED for soils, paving, cast-in-place concrete, precast concrete, masonry, structural steel, fabricated metal work, fire-proofing and inspection services provided by the Owner, to establish compliance with the Contract Documents. The Owner will solicit proposals and select the Testing Agency. All reports and invoices shall be submitted to the Architect and Owner prior to payment. See Section 01 40 00 - Quality Requirements.
- B. Costs Not Included in the Inspecting and Testing Allowance:
 1. Costs of incidental labor and facilities required to assist Testing Agency.
 2. Costs of testing services required to be provided by the Contractor or any subcontractor. Document requirements.
 3. Costs of retesting upon failure of previous tests as determined by Architect.
- C. Payment Procedures:
 1. Submit two copies of the Testing Agency's invoice with next Application For Payment to Architect.
 2. Pay invoice on approval by Architect.
- D. Differences in cost will be adjusted by Change Order.

2.02 GRAPHICS

- A. Allow the sum of \$ TO BE DETERMINED for the purchase and installation of architectural graphics, signage and plaques. This Allowance shall be in addition to the Work of Section 10 14 24: Interior Signage.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 23 00
ALTERNATES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Description of Alternates.
- B. The Contractor shall provide all labor, materials, equipment, and services, etc., necessary for the proper and complete execution of accepted Alternates. Amount of Alternate prices to be added to or deducted from the Base Bid shall be stated on the Proposal Form and shall include cost of any and all modifications made necessary by Owner's acceptance of Alternates.
- C. Related Work Described Elsewhere:
 - 1. Materials and methods to be used in the Base Bid and in the Alternatives are generally described in the Contract Documents.
 - 2. Method for stating the proposed Contract Sum is described in the Proposal Form.
- D. NOTE: Alternates will be carefully considered in the Owner's selection of a Contractor.

1.02 RELATED REQUIREMENTS

- A. Document 00 21 13 - Instructions to Bidders: Instructions for preparation of pricing for Alternates.

1.03 ACCEPTANCE OF ALTERNATES

- A. If the Owner elects to proceed on the basis of one or more of the described Alternates, make all modifications to the Work required in order to furnish and install the selected Alternate or Alternates to the approval of the Architect and at no additional cost to the Owner, other than as proposed on the Proposal Form.
- B. Immediately after award of the Contract, or as soon thereafter as the Owner has made a decision on which, if any, Alternates will be selected, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of Alternates selected by the Owner. Use all means necessary to alert those personnel and suppliers involved as to all changes in the Work caused by the Owner's selection or rejection of Alternates.
- C. It shall be the responsibility of the Contractor to properly coordinate work related to Alternates with all other Work of this Contract in order to ensure that a complete and proper job is provided.
 - 1. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.
- D. Submit a Schedule of Values including adjustments to all Sections affected by accepted Alternates.
- E. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement. The Owner reserves the right to select as many or as few alternates as they deem fit, in any order or combination that they choose.
- F. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

1.04 SCHEDULE OF ALTERNATES

- A. Alternate No.1 (Concrete Slab Moisture Barrier System for Resilient Flooring)
 - 1. No.1A: State the amount to be ADDED to the Base Bid to furnish and install the slab moisture barrier system and primer, if Owner's field testing indicates an issue with slab moisture vapor and alkalinity levels for flooring installations. See Section 12 48 13 – Entrance Floor Mats and Frames.

2. No. 1B: State the amount to be ADDED to the Base Bid to provide blast-trac slab surface preparation to remove surface slab contaminants and produce a bondable surface as required by the slab moisture barrier system.
 3. No. 1C: State the amount to be ADDED to the Base Bid to provide self-leveling cement-based underlayment. See Section 09 65 00 - Resilient Flooring.
- B. Alternate No. 2 (Bullet Resistant Fiberglass)
1. State the amount to be ADDED to the Base Bid to furnish and install Bullet Resistant Fiberglass sheathing as specified herein.
 - a. Applications: Level 1 Interior Walls: Encompassing Police See wall types and noted indicated per the Drawings: Finish slab to underside of floor above.
\$ _____
 - b. Product: Fiberglass reinforced plastic panel consisting of ballistic grade fiberglass cloth impregnated with polyester resin and formed into flat sheet via hydraulic press. Material shall provide for the following UL 752 Level of Protection: Level III (SPSA).
 - 1) Manufacturer's: Safeguard Security Systems, North American Bullet Proof, Point Blank Body Armor, CR Laurence.
 - c. Installation:
 - 1) Install Bullet Resistant Sheathing direct to existing CMU and/or wall stud framing as indicated in the Drawings, in accordance with manufacturer specifications.
- C. Alternate No. 3 (Ceramic Floor Tile – Lobby 102)
1. State the amount to be ADDED to the Base Bid to furnish and install new ceramic floor tile throughout Lobby 101 and Interview 102 in lieu of salvaging and extension of existing floor tile, See Drawings. Include all necessary demolishing of existing floor finishes and preparation of subslab surfaces to receive new ceramic floor tile. Include line item credit from costs included in Base Bid for the protection of and final cleaning of existing flooring.
 - a. Ceramic Floor Tile Product: Dignitary Colorbody Porcelain Tile by Daltile.
 - 1) Color: Selected by Architect from manufacturer standard.
 - 2) Size: 12" x 24" inches.
 - 3) Finish: Textured.
 - b. Trim, setting materials, grouts and accessory materials as required for a complete ceramic floor tile installation per Section 09 30 00.
- D. Alternate No. 4 (Repointing, Crack Repair and Replacement of Masonry)
1. No. 4A: Provide a square foot allowance for the repointing of existing masonry not otherwise identified in the Contract Documents to require pointing. All masonry repointing identified elsewhere in the Contract Documents shall be included in the Base Bid and shall not be paid for as a part of this Allowance. This Allowance shall only be used to pay the cost of repointing of masonry originally assumed not to require such repairs.
 - a. Brick Masonry (Modular units measuring 3-5/8" x 2-1/4" x 7-5/8"):
\$ _____ SF
 - b. CMU Masonry (Modular units measuring 7-5/8" x 7-5/8" x 15-5/8"):
\$ _____ SF
 2. No. 4B: Provide a linear foot allowance for epoxy repair of existing masonry/concrete cracks, fissures or similar irregularities not otherwise identified in the Contract Documents to require repair. All similar epoxy repairs identified elsewhere in the Contract Documents shall be included in the Base Bid and shall not be paid for as a part of this Allowance. This Allowance shall only be used to pay the cost of epoxy repair of masonry/concrete originally assumed not to require such repairs.
 - a. Brick Masonry: \$ _____ SF
 - b. CMU Masonry: \$ _____ SF
 - c. Concrete: \$ _____ SF
 3. No. 4C: Provide a square foot allowance for the removal and replacement of existing masonry units in kind not otherwise identified in the Contract Documents to require replacement. All masonry unit removal and replacement identified elsewhere in the Contract Documents shall be included in the Base Bid and shall not be paid for as a part

of this Allowance. This Allowance shall only be used to pay the cost of removal of and replacement of masonry units originally assumed not to require such scope of work.

- a. Brick Masonry (Modular units measuring 3-5/8" x 2-1/4" x 7-5/8"):
\$ _____ SF
 - b. CMU Masonry (Modular units measuring 7-5/8" x 7-5/8" x 15-5/8"):
\$ _____ SF
4. No. 4D: Provide a square foot allowance for the parging and infill of bed joints and other block face irregularities at existing CMU infill masonry units scheduled to receive application of new weather barriers.
- a. \$ _____ SF
- E. Alternate No. 5 (Existing CMU Substrate Wall Reinforcement)
1. State the amount to be ADDED to the Base Bid to furnish and install repair and reinforcement requirements at existing CMU substrate walls as indicated per the Structural Drawings. See Structural Drawings (S-Series) for clarification.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 30 00
ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electronic document submittal service.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Job meetings.
- E. Requests for Information.
- F. Construction reports.
- G. Construction Progress Schedule.
- H. Materials Schedule.
- I. Submittal Schedule.
- J. Progress photographs.
- K. Coordination Drawings.
- L. Shop Drawings.
- M. Approval Drawings.
- N. Product Data, Certifications, Delegated-Design Submittals
- O. Submittals for review, information, and project closeout.
- P. Submittal procedures.
- Q. Architect's Review

1.02 RELATED REQUIREMENTS

- A. Section 01 00 00 - General Requirements.
- B. Section 01 78 10 - Warranties.
- C. Section 01 78 00 - Project Close-out: Project record documents.

1.03 PROJECT COORDINATION

- A. Project Coordinator: Contractor.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for delivery access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.

7. Applications for payment and change order requests.
8. Progress schedules.
9. Coordination drawings.
10. Correction Punch List and Final Correction Punch List for Substantial Completion.
11. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF) format and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 1. Besides submittals for review, information, and closeout, this procedure applies to requests for information (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 2. It is Contractor's responsibility to submit documents in PDF format.
 3. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
 4. Users of the service need an email address, Internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 5. Paper document transmittals will not be reviewed; emailed PDF documents will not be reviewed.
 6. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the contract sum.
- C. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- D. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting after Notice of Award.
- B. Agenda:
 1. Introductions of attendees and their Project duties.
 2. Execution of Owner- Contractor Agreement.
 3. Submission of executed bonds and insurance certificates.
 4. Distribution of Contract Documents.
 5. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
 6. Designation of personnel representing the parties to Contract , Contractor, Owner and Architect.
 7. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.

8. Procedures and safety plan for use of and access throughout the existing building and site in coordination with ongoing Owner activities.
 - a. Review of the Emergency procedures and contacts.
 9. Scheduling.
 - a. Particular focus to be the review of the Work Phasing Plan as submitted and agreed to by the Owner.
 10. See Section 01 00 00 General Requirements
- C. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.03 SITE MOBILIZATION MEETING

- A. The Contractor shall schedule a meeting at the Project site prior to his occupancy.
- B. Project Coordinator will schedule meeting at the Project site prior to Contractor occupancy.
- C. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's Superintendent.
 5. Major Subcontractors.
- D. Agenda:
 1. Use of premises by Owner and Contractor.
 2. Owner's requirements and occupancy prior to completion.
 3. Construction facilities and controls provided by Owner.
 4. Temporary utilities provided by Owner.
 5. Survey and building layout.
 6. Security and housekeeping procedures.
 7. Procedures and safety plan for use of and access throughout the existing building and site in coordination with ongoing Owner activities.
 - a. Review of the Emergency procedures and contacts.
 8. Schedules.
 9. Application for payment procedures.
 10. Scope and procedures for testing and inspections. Review of Statement of Special Inspections and Testing Agency duties.
 11. Procedures for maintaining record documents.
 12. Requirements for start-up of equipment.
 13. Inspection and acceptance of equipment put into service during construction period.
- E. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.04 JOB MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.
- B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Architect.
 4. Contractor's Superintendent.
 5. Major Subcontractors.

- D. Agenda:
1. Review minutes of previous meetings.
 2. Review of Work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Maintenance of progress schedule including submission and presentation of the two week look ahead schedule.
 7. Corrective measures to regain projected schedules.
 8. Planned progress during succeeding work period.
 9. Maintenance of quality and work standards.
 10. Review of testing and inspection reports.
 11. Effect of proposed changes on progress schedule and coordination.
 12. Other business relating to Work.
- E. Contractor shall record minutes and distribute copies within two days after meeting to participants, with copies to Architect, Owner, participants, and those affected by decisions made.

3.05 CONSTRUCTION REPORTS

- A. The Contractor's superintendent shall maintain an on-site daily construction log, recording the following information concerning events at the site and allow access to the Owner and Architect for review.
1. List of subcontractors at the site.
 2. Approximate count of personnel at the site.
 3. Visitors at the site.
 4. High and low temperatures, general weather conditions.
 5. Accidents and unusual events.
 6. Meetings held at the site.
 7. Communications received or conveyed by the superintendent.
 8. Stoppages, delays, shortage, losses.
 9. Meter readings and similar recordings.
 10. Emergency procedures.
 11. Orders and requests of governing authorities.
 12. Testing agency observations and tests.
 13. Change orders received and implemented.
 14. Services connected, disconnected.
 15. Significant deliveries.
 16. Equipment or system tests and start-ups.
 17. Partial completions, occupancies.
 18. Substantial Completions authorized.
 19. Masonry reports.

3.06 REQUESTS FOR INFORMATION

- A. Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified. All RFIs shall be submitted to the Architect through the Contractor.
- B. Content of the RFI shall include the Project name and number, date, name of Contractor, RFI number, assigned sequentially, RFI subject, Specification Section number and paragraph number, as applicable, Drawing and detail number as applicable, field dimensions and conditions as applicable, Contractor's suggested resolution and any impact on time or cost, Contractor's signature. Attach any sketches, descriptions, photos or other information relevant to fully describe items needing interpretation.
- C. Architect's Action: Architect will review each RFI, determine action required and respond. Allow 10 working days for Architect's response to each RFI. Architect's action may include a request

for additional information. If the Contractor believes the RFI response warrants a change in Contract Time or the Contract Sum, notify the Architect in writing within 10 days of receipt of the RFI response.

- D. RFI Log: Prepare, maintain and submit an RFI log organized by RFI number. Submit log weekly. Include date RFI was submitted and date of Architect's response.
- E. On receipt of Architect's action, update RFI log and distribute response to affected parties. Notify Architect within 7 days if Contractor disagrees with response.

3.07 CONSTRUCTION PROGRESS SCHEDULE

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review. All significant construction activities shall be represented. Time duration shall be in weekly increments. If work is planned in phases, provide scheduling for each phase. Schedules shall be coordinated with Owner's on-going occupancy, as applicable.
 - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
 - 2. Provide a detailed two week look ahead schedule indicating anticipated type of work, areas of work to occur, access required by Contractor, interruptions to Owner activities (as applicable), other items or activities critical to or of importance to ongoing activities by both the Contractor and Owner.
- D. Time Frame: Schedule shall extend from date established for the Notice to Proceed to the date of Final Completion. Contract completion date shall not be changed unless specifically authorized by Change Order.
- E. Activities: Define activities so no activity is longer than 20 days, unless allowed by the Architect. Include procurement process activities for long lead items and major items. Include review and submittal time. Include not less than 30 days for start-up and testing. Include key milestones for commissioning activities such as documentation, time and duration of testing. Indicate date of Substantial Completion and allow time for Architect's activities necessary for certification of Substantial Completion. Include time indicated in Form of Agreement for completion of punchlist items and final completion. If not indicated, include not more than 60 days.
- F. Include constraints and work restriction indicated in the Contractor Documents and show how the sequence of Work is affected, including phasing, work under multiple contracts, work by Owner, coordinating with existing construction, uninterruptible services, premises use restrictions, and other work restrictions.
- G. Include important stages of construction and milestones including, but not limited to, Notice to Proceed, Completion of each phase, if applicable, Substantial Completion and Final Completion.
- H. Gantt-Chart Schedule: Submit a comprehensive fully developed horizontal Gantt-chart type Contractor's Construction Schedule within 14 days of date established for the Notice of Award. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of the Project.
- I. Submit biweekly look ahead schedules at each job meeting.
- J. Submit updated overall project schedule with each Application for Payment.

3.08 CONTRACTOR'S SCHEDULE OF MATERIALS

- A. Within twenty-one (21) days after date established for the Commencement of the Work, prepare and submit to the Architect a projected schedule for materials delivery, clearly identifying all products with long lead times or which are likely to cause delay due to unavailability, extended delivery dates or any other reason. Once approved, long lead times shall be pre-ordered in a timely manner as not to delay the progress of the Work. The Contractor shall assume full responsibility for delays attributed to unavailability, insufficient time

for delivery and/or installation of materials or performance of the Work, unless he has conformed with these instructions.

3.09 CONTRACTOR'S SUBMITTAL SCHEDULE

- A. Within ten (10) days after development and acceptance of the Contractor's Construction Schedule, prepare and submit to the Architect a complete schedule of submittals. Coordinate schedule with subcontractors and provide adequate time for review, processing and the possibility of non-acceptance and resubmission. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of ordering materials or performance of the Work to permit processing. Update schedule as necessary.

3.10 PROGRESS PHOTOGRAPHS

- A. Submit a minimum of 20 digital photographs with each application for payment, taken not more than 7 days prior to submission of Application For Payment.
 - 1. Identify project name, date, description of view and key plan of location if needed.
- B. Maintain one set of all photographs at Project site for reference; same copies as submitted, identified as such.
- C. Provide auxiliary lighting as required to produce clear, well-lit photographs without obscuring shadows. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion
- D. Photography Type: Digital; electronic files.
- E. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, acceptable to Architect.
- F. In addition to periodic, recurring views, take photographs of each of the following events:
 - 1. Excavations in progress.
 - 2. Completion of demolition showing conditions of existing substrate structures.
 - 3. Completion of repairs and/or replacement of existing substrates where applicable.
 - 4. Completion of installation of weather barrier systems including associated flashings and other terminations.
- G. Digital Photographs: 24 bit color, minimum resolution of 1280 by 960 ("1 megapixel"), in JPG format; provide files unaltered by photo editing software.
 - 1. Delivery Medium: On photo CD, flash drive, e-mail or link to on-line file share site either hosted by the Contractor or other, such as DropBox.
 - 2. File Naming: Include project identification, date and time of view, and view identification.

3.11 SHOP DRAWINGS

- A. Shop Drawings: Shop drawings include fabrication and installation drawings, coordination drawings, setting diagrams, schedules, patterns, templates, and similar drawings specially prepared for the Work by the Contractor, subcontractors, manufacturers, fabricators, suppliers or distributors to illustrate some portion of the Work.
 - 1. Shop drawings shall show the design, dimensions, connections, and other details necessary to ensure the accurate interpretation of the Contract Documents and shall show adjoining Work in such detail as required to provide for proper connection to same. Where adjoining Work requires shop drawings, they shall be submitted concurrently for a coordinated review.
 - 2. Submit information specifically prepared for this Project, drawn to accurate scale. Do not reproduce Construction Documents or copy standard information as the basis for shop drawings. Standard information prepared without specific reference to the Project is not considered a shop drawing. Clearly and specifically indicate deviations from the Contract Documents.
 - 3. In addition to the above, include the following information:
 - a. Dimensions and notation of dimensions established by field measurements.
 - b. Identification of products and materials included.

- c. Compliance with specified standards.
 - d. Notation of coordination requirements and specific procedures.
 - e. Utility connections for equipment.
 - f. Identification of any change, variance or non-conformance with requirements of Contract Documents. Indicate with a "cloud" and provide detailed notation including reason for each change. Include completed "Contractor's Substitution Request" (See Section 01 60 00).
 - g. Indication by the Contractor that he has reviewed, coordinated (checked for dimension, quantity, relationship with work of all trades involved and is in accordance with the Contract requirements), and approved the Shop Drawing for submittal to the Architect.
4. Electronic Media: See Section 01 00 30 - Electronic Media, for information regarding obtaining electronic documents and their limited use for purposes of project coordination and the Contractor's use in the preparation of submittals.
- a. Unless express written permission of the Architect is granted, electronic documents provided by the Architect and his consultants, shall not be used by the Contractor, or any of his subcontractors of any tier or any materials supplier or vendor as a shop drawing or any other type of submittal or as the basis for preparing such shop drawing or submittal, with the sole exception to this prohibition being that electronic documents may be used as backgrounds upon which to prepare shop drawings or other submittals.

3.12 COORDINATION DRAWINGS

- A. Coordination Drawings are a special type of shop drawing prepared by various trades to show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended.
1. The Contractor shall arrange coordination meetings and require attendance of each (major) subcontractor in order to establish priorities for systems installation, to establish systems installation sequences, to determine and resolve potential conflicts, and to ensure that each trade has coordinated its work with the others and will honor commitments to other disciplines.
 2. Each subcontractor's representative shall sign the final coordination drawings, prior to submission for Architect's review, certifying they have coordinated each building system, resolved all potential conflicts between each trade's work, and have satisfied the intent of each disciplines design.
 3. Where potential conflicts cannot be resolved without input from, or review by, the Architect, the Contractor shall request said input/review, in writing, and provide all sketches, details, part plans, etc. necessary to convey fully the essence of the situation and/or potential conflict. The Contractor and all appropriate subcontractors shall make themselves available to meet with the Architect as required to resolve the issue(s) in question.
 4. Coordination Drawings shall be required for all building structure, ductwork, and piping systems.

3.13 APPROVAL DRAWINGS

- A. Whenever the Contractor or subcontractor is required to submit Shop Drawings and/or Product Data to the Authority Having Jurisdiction over the Project for review and approval of a particular component or system, prior to starting on-site work, the Contractor shall submit to the Architect two (2) copies of the approved documents including the authority stamp and approving signature. Submit as "For Information Only".

3.14 RECORD DRAWINGS

- A. Record Drawings: See Section 01 78 00 - Project Close-out.

3.15 PRODUCT DATA

- A. Compile Product Data into a single submittal for each element of construction or complete system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, materials test reports, color charts, roughing-in diagrams, templates, and wiring diagrams. Mark each copy to show applicable choices and options.
 - 1. Identify any change, variance, or non-conformance with requirements of Contract Documents with a "cloud" and provide detailed notation including reason for each change. Provide a completed "Contractor's Substitution Request" (see Section 01 60 00).

3.16 CERTIFICATIONS

- A. Certifications from manufacturers and/or installers required in individual Specification Sections shall be submitted with Product Data.
 - 1. In accordance with Supplementary General Conditions, Article 3, prior to Substantial Completion, the Contractor shall submit a written certificate that no asbestos and/or other hazardous substances have been incorporated into the Work of this Project.
 - 2. Contractor's Asbestos/Hazardous Material Certification with the following language:
 - a. I, _____ the undersigned representing (company), do hereby certify that the products furnished and/or fabricated and/or installed by my firm under contract with (G.C. or C.M.) at the (Project) located in (project location) do not contain asbestos and /or other hazardous materials.
 - b. Provide signature, title and date.
 - c. The form of certificate shall be submitted to the Architect for review prior to use.

3.17 DELEGATED-DESIGN SUBMITTALS

- A. Where professional engineering services or certifications by a professional engineer are specifically required to be provided by the Contractor, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certifications required, submit a written request for additional information to the Architect.
 - 2. In addition to Shop Drawings, Product Data, and other required submittals, submit a certification, signed and sealed by the responsible professional engineer, licensed in the State of the Project, for each product and system specifically assigned to the Contractor to be engineered or certified by a professional engineer, indicating that the products and systems are in compliance with performance and design criteria indicated. Include a list of codes, loads, and other factors used in performing these services.

3.18 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual Sections, submit for review:
 - 1. Product data.
 - 2. Shop drawings.
 - 3. Samples for selection.
 - 4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
- C. Samples will be reviewed only for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below .

3.19 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual Sections, submit for information:
 - 1. Design data.
 - 2. Certificates.
 - 3. Test reports.
 - 4. Inspection reports.
 - 5. Manufacturer's instructions.

6. Manufacturer's field reports.
7. Other types indicated.

B. Submit for Architect's knowledge as contract administrator. No action will be taken.

3.20 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual Sections, submit them at project closeout:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

3.21 NUMBER OF COPIES OF SUBMITTALS

- A. Documents for Review: Submittals to the Architect shall be electronic files in PDF format, unlocked, markable and reproducible; an electronically-marked up file will be returned. Create PDFs at native size and right-side up. Illegible files will be returned. In addition to electronic files, the following types of submittals shall also be submitted in hard copy, quantity indicated:
 1. Steel rebar (2).
 2. Structural steel and deck (2).
 3. Doors and Frames (1).
 4. Door hardware (1).
 5. Millwork and casework (1).
 6. Sprinkler shop drawings (2).
 7. Fire alarm shop drawings (2).
 8. Small Size Sheets, Not Larger Than 11 x 17 inches.
 9. Large Size Sheets, Not Larger Than 30 x 42 inches. .
- B. Documents for Information: Submit three copies.
- C. Samples: Confirm with the Architect the number of samples required for each submittal; one of which will be retained by Architect.
 1. After review, produce duplicates.
 2. Retained samples will not be returned to Contractor unless specifically so stated.

3.22 SUBMITTAL PROCEDURES

- A. Shop Drawing Procedures:
 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- B. Transmit each submittal with a copy of approved submittal form.
- C. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- D. Submittal form shall include identification information: Project name, Contractor, Subcontractor or supplier; product name, pertinent drawing and detail number, and specification section number, submittal category, date, and total number of pages in the submittal.
- E. Contractor's Action and Certification: The Contractor shall review each submittal, check for compliance with the Contract Documents, note corrections, note field dimension, and complete a review stamp with the following information:
 1. Contractor stamp, signed or initialed certifying that the submittal conforms to requirements of the Contract Documents in accordance with AIA A201, Paragraph 3.12.; or, Submittal

deviates from requirements of the Contract Documents, with deviations clearly noted and marked with Contractor's initials; or, Contractor's substitution requested.

- F. Deliver submittals to Architect at business address. Submittals may only be sent directly to the Architect's consultants by special arrangement with the Architect. Subcontractors shall not directly send submittals to the Architect.
- G. Submittals of poor legibility may be returned without action.
- H. Submittals not including a completed Contractor's Certification will be returned without action.
- I. Submittals certified as in conformance by the Contractor and found to deviate from requirements of the Contract Documents will be returned without action.
- J. The Contractor may require sub-contractors to submit similar certification, however this shall not in any way relieve the Contractor of responsibility for review and certification of all submittals.
- K. All notations made on submittals by the Contractor, sub-contractors, suppliers, or fabricators shall be made in bold line type and initialed by person making the notations. Clearly indicate specified items with a "cloud" or arrows. Cross out all extraneous information not intended as part of the submission. Do NOT use highlighter or colored markings, only arrows, circles, text and the like that can be copied in black and white shall be allowed.
- L. Provide a detailed notation of all deviations from the Contract Document requirements including minor variations and limitations, and the reason for each deviation. Include a Contractor's Substitution Request.
- M. Contractor's Substitution Request: All requests for substitutions shall be submitted on the form included at the end of Section 01 60 00 - Product Requirements.
- N. Schedule submittals to expedite the Project, and coordinate submission of related items.
- O. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
- P. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- Q. Provide space for Contractor and Architect review stamps.
- R. When revised for resubmission, identify all changes made since previous submission.
- S. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- T. Submittals not requested will not be recognized or processed.
- U. Do not order materials or proceed with the Work requiring submission and review of Product Data, Shop Drawings, Samples or similar submittals prior to receiving acceptance of the submittal from the Architect.
- V. The Contractor shall not use or take submittals on-site without the Architect's or the Architect's consultant's Submittal Stamp indicating acceptance. Submittals without this stamp or with a stamp indicating non-acceptance shall not be used in connection with construction.

3.23 ARCHITECT'S REVIEW

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Architect will review each submittal and mark to indicate action taken.
 - 1. In general, the Architect will strive to complete his review of submittals and return them to the Contractor in approximately two (2) weeks. Additional time may be required if large volumes of submittals are simultaneously delivered to the Architect for review. Where concurrent review of submittals by Architect's consultants, Owner, or other parties is required, allow three (3) weeks for initial review of each submittal.
 - 2. The Architect will not review submittals of colors and finishes until submittals for all such related materials are complete and delivered for collective review. This same

- requirement may be extended to other components and systems as deemed appropriate by the Architect.
3. The Architect's review shall, among other limitations, not include the calculation, coordination, or verification of dimensions or quantities, which shall be the sole responsibility of the Contractor.
 4. Action Stamp: The Architect will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows to indicate the action taken:
 - a. Final Unrestricted Release: Where submittals are marked "No Exceptions Taken", that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents.
 - b. Final-but-Restricted Release: Where submittals are marked "Note Markings" or "Comments Attached" or "Revise and Resubmit Record Copy", that part of the Work covered by the submittal may proceed provided it complies with markings / comments and requirements of the Contract Documents.
 - c. Returned for Resubmittal: Where submittals are marked "Revise and Resubmit for Further Review", do not proceed with that part of the Work covered by the submittal including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat as necessary to obtain a different action mark.
 - d. Rejected: When the submittal is marked "Rejected", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Do not resubmit that product.
- B. Other Action: Where a submittal is primarily for record purposes, the submittal will be returned marked "Received and Distributed for Record Only". Where a submittal cannot be reviewed due to lack of Contractor review or illegibility, for example, the submittal will be returned marked "Returned No Action".

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Samples, Mock-ups and Sample Field Installations.
- B. References and standards.
- C. Testing and inspection agencies and services.
- D. Control of installation.
- E. Tolerances.
- F. Manufacturers' field services.
- G. Defect Assessment.

1.02 RELATED REQUIREMENTS

- A. Section 01 00 00 - General Requirements.
- B. Section 01 21 00 - Allowances: Allowance for payment of testing services.
- C. Section 01 30 00 - Administrative Requirements: Submittal procedures.
- D. Section 01 45 33 - Code-Required Special Inspections: Project testing and inspections required by the building code and AHJ.

1.03 DEFINITIONS

- A. Code or Building Code: 2009 Edition of the International Building Code, Chapter 17 - Structural Tests and Inspections.
- B. Authority Having Jurisdiction (AHJ): Agency or individuals officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. Special Inspections:
 - 1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the building code and AHJ that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
 - 2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

1.04 REFERENCE STANDARDS

- A. ASTM C1021 - Standard Practice for Laboratories Engaged in Testing of Building Sealants; 2008 (Reapproved 2014).
- B. ASTM C1077 - Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation; 2014.
- C. ASTM C1093 - Standard Practice for Accreditation of Testing Agencies for Masonry; 2013.
- D. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- E. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.
- F. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.
- G. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2010.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Contractor's Testing Agency Qualifications: Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
- C. Contractor's Test Reports: After each test/inspection, promptly submit one copy of reports to Architect, Engineer, Building Official and to Owner. Information required on Test Reports shall be as identified herein for the Owner's Testing Agency.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test/inspection.
 - h. Date of test/inspection.
 - i. Results of test/inspection.
 - j. Conformance with Contract Documents.
 - k. When requested by Architect, provide interpretation of results.
 - 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.
- D. Certificates: When specified in individual Specification Sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
 - 1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
 - 2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.
- E. Manufacturer's Instructions: When specified in individual Specification Sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
- F. Manufacturer's Field Reports: Submit reports within 10 days of observation to Architect and Owner for their information.
 - 1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.
- G. Erection Drawings: Submit drawings to the Architect and Owner for their information.
 - 1. Submit for information for the sole and limited purpose of generally assessing conformance with the design intent expressed in the Contract Documents.
 - 2. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

1.06 REFERENCES AND STANDARDS

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference 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 of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

- C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

1.07 TESTING AND INSPECTION AGENCIES AND SERVICES

- A. Quality control services include inspections, tests, and related actions including reports performed by independent agencies, governing authorities, and the Contractor. They do not include Contract enforcement activities performed by the Architect.
- B. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with Contract Document requirements.
- C. Specific quality control requirements for individual construction activities are specified in the Sections that specify those activities. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
- D. Inspections, tests and related actions specified are not intended to limit the Contractor's quality control procedures that facilitate compliance with Contract Document requirements.
- E. Requirements for the Contractor to provide quality control services as directed by the Architect, Owner, or Authorities Having Jurisdiction are not limited by the provisions of this Section.
- F. The Owner will employ services of an independent testing agency(s) to perform Special Inspections and certain specified tests and inspections specified by the Owner; payment for cost of services will be derived from allowance specified in Section 01 21 00; see Section 01 21 00 and applicable sections for description of services included in allowance.
- G. The Contractor shall employ and pay for services of an independent testing agency to perform other specified testing and inspection. See paragraph TESTING AND INSPECTIONS.
- H. Testing and Inspection Agencies Quality Assurance:
 - 1. Testing agency: Comply with requirements of ASTM E329, ASTM E543, ASTM C1021, ASTM C1077, ASTM C1093, and ASTM D3740.
 - 2. Inspection agency: Comply with requirements of ASTM D3740 and ASTM E329.
 - 3. Laboratory Qualifications: Accredited by IAS according to IAS AC89.
 - 4. Laboratory: Authorized to operate in the State in which the Project is located.
 - 5. Laboratory Staff: Maintain a full time registered Engineer on staff to review services.
 - 6. Testing Equipment: Calibrated at reasonable intervals either by NIST or using an NIST established Measurement Assurance Program, under a laboratory measurement quality assurance program.

1.08 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Conducted by Special Inspectors as indicated in the Statement of Special Inspections, appended to Section 01 45 33 - Code-Required Special Inspections. Special Inspectors shall:
 - 1. Verify that manufacturer maintains detailed fabrication and quality-control procedures and review the completeness and adequacy of those procedures to perform the Work.
 - 2. Notify AHJ, Architect, Structural Engineer of Record, Contractor and Owner promptly of irregularities and deficiencies observed in the Work during performance of its service.
 - 3. Submit a certified written report of each test, inspection, and similar quality-control service to AHJ, Architect, Structural Engineer of Record, Owner and Contractor.
 - 4. Submit a final report of special tests and inspections, identifying any unresolved deficiencies to AHJ, Architect, Structural Engineer of Record, Owner and Contractor.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Construction Documents.
 - 6. Retesting and re-inspecting corrected work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have Work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on 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, and disfigurement.

3.02 SAMPLES, MOCK-UPS AND SAMPLE FIELD INSTALLATIONS

- A. Before installing portions of the Work where mock-ups are required, construct mock-ups in location and size indicated for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work. The purpose of mock-up is to demonstrate the proposed range of aesthetic effects and workmanship.
- B. Accepted mock-ups establish the standard of quality the Architect will use to judge the Work.
- C. Integrated Exterior Mock-ups: construct integrated exterior mock-up as indicated on Drawings. Coordinate installation of exterior envelope materials and products as required in individual Specification Sections. Provide adequate supporting structure for mock-up materials as necessary.
- D. Provide supervisory personnel who will oversee mock-up construction. Provide workers that will be employed during the construction at Project.
- E. Tests shall be performed under provisions identified in this Section and identified in the respective product Specification Sections.
- F. Assemble and erect specified items at full scale, with specified attachment and anchorage devices, flashings, seals, and finishes.
- G. Obtain Architect's approval of mock-ups before starting work, fabrication, or construction.
 - 1. Architect will issue written comments within seven (7) working days of initial review and each subsequent follow up review of each mock-up.
 - 2. Make corrections as necessary until Architect's approval is issued.
- H. The purpose of mock-ups and sample field installations shall be to clearly establish standards of quality for the Work prior to proceeding with the Work itself. They shall be constructed in sizes, locations and quantities as directed by the Architect.
- I. To the extent possible, all samples, mock-ups and sample field installations accepted by Architect shall be preserved until the Work itself has been completed and accepted by the Architect. The alteration, destruction or removal of mock-ups and sample installations shall not commence without the Architect's prior authorization.
- J. The Contractor and/or his subcontractors shall construct or prepare all samples, mock-ups and sample field installations as required in individual Specification Sections or as directed by the Architect.

- K. Sample field installations are full sized, fully fabricated, cured, and finished built in-place assemblies that may be permanent if acceptable to the Architect.
- L. Samples shall be clearly marked with the manufacturer's name, generic description of the sample and compliance with required standards. Where samples are for selection of color, pattern, texture, or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.
- M. All costs related to providing, maintaining and removing required samples, mock-ups and sample field installations shall be paid by the Contractor.

3.03 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

3.04 TESTING AND INSPECTIONS

- A. See Section 01 45 33 - Code Required Special Inspections, and individual Specification Sections for testing and inspections required.
- B. Testing Agency Duties and Responsibilities:
 - 1. Test samples of mixes submitted by Contractor.
 - 2. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
 - 3. Perform specified sampling and testing of products in accordance with specified standards.
 - 4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
 - 5. Promptly notify (within 24 hours) Owner, Architect and Contractor of observed irregularities or non-conformance of Work or products during performance of its services.
 - 6. Perform additional tests and inspections required by Architect.
 - 7. Verify samples submitted by Contractor comply with the referenced standards and the approved contract documents.
 - 8. Attend preconstruction meetings and progress meetings, as requested.
 - 9. Submit written reports of all tests, inspections or other services to the AHJ, Architect, Structural Engineer of Record, Owner and Contractor. Reports indicating compliant inspections shall be submitted within three (3) days. Reports shall include:
 - a. Date of issue.
 - b. Project name and number.
 - c. Name, address, and telephone number of testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making tests or inspections.
 - f. Designation of the Work and test method.
 - g. Identification of product and Specification Section.
 - h. Complete inspection or test data.
 - i. Test results and interpretations of test results.
 - j. Ambient conditions at time of sample taking, testing, or inspection.
 - k. Comments or professional opinion regarding whether inspected or tested Work complies with the Contract Documents.
 - l. Recommendations for re-testing.
 - m. Name and signature of laboratory inspector.
 - 10. The Testing Agency shall maintain a complete deficiency list of all items not corrected and shall re-test and/or re-inspect as required after each deficiency has been corrected. All such re-testing and re-inspection shall be at the Contractor's expense. The Testing Agency shall submit a final signed report, stating whether or not all corrections have been made and the Work tested and inspected conforms to the Contract Documents.

11. Limits on Testing/Inspection Agency Authority:
 - a. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
 - b. Agency may not approve or accept any portion of the Work.
 - c. Agency may not assume any duties of Contractor.
 - d. Agency has no authority to stop the Work.
- C. Owner Duties and Responsibilities:
 1. The Owner will provide Special Inspections, observations, inspections, tests and similar quality control services specified to be performed by independent agencies, except where they are specifically indicated as the Contractor's responsibility or are provided by another identified entity. The costs for Owner provided testing and inspection services shall be paid for by the Owner.
 2. The Owner will employ directly an independent agency, testing laboratory, or other qualified firm to perform Special Inspections and other testing that are the Owner's responsibility. See Section 01 45 33 - Special Inspections and individual Specification Sections for the scope of such inspections and tests.
 3. See Section 01 45 33 - Code Required Special Inspections for scope of those inspections.
 4. Such individual Specification Sections for the scope of other inspections and tests which shall include be not be limited to:
 - a. Division 9: Concrete slab moisture humidity and Ph testing.
- D. Contractor's Testing and Inspections:
 1. The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity. Costs for these services shall be included in the Contract Sum.
 2. The Contractor shall employ and pay an independent testing agency to perform quality control services, including but not limited to inspections, sampling and tests required for determining the suitability of materials prior to delivery to the site, field testing, and other services as specified in the Specification Sections. Such inspections and tests shall include, but may not be limited to the following:
 - a. Division 1: Indoor air quality.
 - b. Division 3: Concrete mix designs and pre-construction tests.
 - c. Division 3: Cast underlayment cylinder compression testing, if required.
 - d. Division 3: GFRC water absorption testing.
 - e. Division 4: Pre-construction unit masonry testing.
 - f. Division 7: Sealant field testing.
 - g. Division 8: Storefront field water leakage testing.
 - h. Division 8: Curtain wall field water leakage testing.
 - i. Division 9: Wall substrate moisture testing for paints and coatings.
 - j. Division 21: Fire suppression system testing.
 - k. Division 22: Piping systems testing.
 - l. Division 23: HVAC systems.
 - m. Division 23: Piping systems testing.
 - n. Division 26, 27, 28: Electrical systems testing.
 - o. Division 32: Analysis of loam.
 - p. Where the Owner has engaged a testing agency or other entity for testing and inspection of a part of the Work and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner, unless otherwise agreed in writing with the Owner.
- E. Contractor Duties and Responsibilities:
 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.

3. Provide incidental labor and facilities:
 - a. To provide access to Work to be tested/inspected.
 - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
 - c. To facilitate tests/inspections.
 - d. To provide storage and curing of test samples.
 4. Scheduling: Notify Testing Agency, Special Inspector, Owner's Representative and, Architect sufficiently in advance of operations to allow for the proper assignment of personnel and scheduling of testing and inspections.
- F. Re-testing:
1. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by the Special Inspector and/or Architect.
 2. Re-testing required because of non-conformance to specified requirements shall be paid for by the Contractor.
 3. The Contractor is responsible for re-testing where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with the Contract Document requirements, regardless of whether or not the original test was the Contractor's responsibility. Cost of re-testing construction revised or replaced by the Contractor is the Contractor's responsibility.
- G. Indoor Air Quality Testing:
1. The Contractor shall engage the services of a Certified Industrial Hygienist, using an AIHA accredited laboratory to comply with RSA 10-B, Chapter 1800 Occupational Health Rules (New Hampshire Air Quality Act).
 - a. In accordance with New Hampshire He-P1804.05 Standards, the following shall be tested and certified: Noise, Radon, Carbon Dioxide, Formaldehyde, Mold, and Mildew.
 - b. The Contractor shall forward the Certified Industrial Hygienists data analysis reports to the Owner.
 - c. The Contractor shall provide a clean air certification to the Owner immediately following Substantial Completion. Receipt of the certification shall be a condition of Final Payment.

3.05 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report in writing, observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

3.06 DEFECT ASSESSMENT

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

END OF SECTION

SECTION 01 45 33
CODE-REQUIRED SPECIAL INSPECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Code-required special inspections.
- B. Submittals.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: General requirements for testing and inspections and project testing and inspections other than Special Inspections.

1.03 DEFINITIONS

- A. Code or Building Code: 2009 Edition of the International Building Code, Chapter 17 - Structural Tests and Inspections.
- B. Authority Having Jurisdiction (AHJ): Agency or individuals officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.
- C. Special Inspections:
 - 1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the building code and AHJ that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
 - 2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

1.04 REFERENCE STANDARDS

- A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
- B. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- C. AISC 341 - Seismic Provisions for Structural Steel Buildings; 2010.
- D. AISC 360 - Specification for Structural Steel Buildings; 2010.
- E. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2010, with 2013 Supplements and Errata.
- F. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement ; 2015.
- G. ASTM C31 - Standard Practice for Making and Curing Concrete Test Specimens in the Field ; 2012.
- H. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete ; 2010.
- I. ASTM D3740 - Standard Practice for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction; 2012a.
- J. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection and/or Testing; 2014a.
- K. ASTM E543 - Standard Specification for Agencies Performing Nondestructive Testing; 2013.
- L. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2010.
- M. IAS AC291 - Accreditation Criteria for Special Inspection Agencies; 2012.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Special Inspectors Qualifications: Prior to the start of work, proposed Special Inspectors shall submit their qualifications to the AHJ for review and acceptance.
- C. Testing & Inspections Agency Qualifications: Prior to the start of work, the Testing & Inspections Agency shall submit the following to the AHJ, Architect, Structural Engineer of Record, Owner and Contractor:
 - 1. Agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
 - 2. Copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
 - 3. Documentation that Testing Agency is accredited by IAS according to IAS AC89.
- D. Special Inspection Reports: After each special inspection, all Special Inspectors and Testing Agencies shall promptly submit copies of their report to Architect, Structural Engineer of Record, Owner, Contractor, and AHJ at intervals identified on the Statement of Special Inspections.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.
 - d. Date and time of special inspection.
 - e. ICC, AWS and ACI certification #s.
 - f. Identification of product and Specifications Section.
 - g. Location in the Project.
 - h. Type of test or special inspection.
 - i. Date of test or special inspection.
 - j. Results of test or special inspection. Failing inspections and tests, as well as retests shall be clearly identified.
 - k. Conformance with Contract Documents.
 - 2. Final Special Inspection Report: Each Special Inspector shall submit a Final Report upon the conclusion of each special inspection regime. Document special inspections and correction of failed testing and inspections, corrective action and successful re-tests in a final report to be submitted to the AHJ, Architect, Structural Engineer of Record, Contractor and Owner.
 - 3. The Architect as Registered Design Professional in Responsible Charge shall assemble all Final Reports submitted by the Special Inspectors, determine that all required test and inspection reports have been submitted, and submit a Project Final Report Summary to the AHJ, Owner and Contractor.
- E. Fabricator Special Inspection Reports: After each special inspection of fabricated items at the Fabricator's facility, Special Inspector shall promptly submit copies of report to Architect, Structural Engineer of Record, Contractor, Owner and AHJ.
 - 1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of Special Inspector.
 - d. Date and time of special inspection.
 - e. Identification of fabricated item and specification section.
 - f. Location in the Project.
 - g. Results of special inspection.
 - h. Verification of fabrication and quality control procedures.
 - i. Conformance with Contract Documents.
 - j. Conformance to referenced standard(s).

- F. Test Reports: After each test or inspection, promptly submit copies of report to Architect, Structural Engineer of Record, Contractor, Owner and AHJ.
1. Include:
 - a. Date issued.
 - b. Project title and number.
 - c. Name of inspector.
 - d. Date and time of sampling or inspection.
 - e. Identification of product and specifications section.
 - f. Location in the Project.
 - g. Type of test or inspection.
 - h. Date of test or inspection.
 - i. Results of test or inspection.
 - j. Conformance with Contract Documents.

1.06 TESTING AND INSPECTION AGENCIES

- A. The Owner shall employ services of an independent testing and inspection agency and/or agencies to perform inspections and tests associated with Special Inspections required by the building code.
1. The Owner will employ services of an independent testing agency to perform certain other testing and inspections that are not Special Inspections as identified in Section 01 40 00.
 2. The Contractor shall employ services of an independent testing agency(s) to perform certain other testing and inspections that are not Special Inspections as identified in Section 01 40 00.
- B. Employment of agency(s) in no way relieves the Contractor of the obligation to perform the Work in accordance with requirements of the Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

- A. Frequency of Special Inspections: Special Inspections are indicated as continuous, periodic, or aperiodic.
1. Continuous Special Inspection: Approved individual of the Special Inspection agency shall be present in the area where the work is being performed and observe the work at all times the work is in progress.
 2. Periodic Special Inspection: Approved individual of the Special Inspection agency shall be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.
 3. Aperiodic Special Inspection: Approved individual of the Special Inspection agency shall be present in the area where work is being performed and observe the work irregularly scheduled as required or as needed.

3.02 TESTING AGENCY AND INSPECTORS DUTIES AND RESPONSIBILITIES

- A. See Section 01 40 00 – Quality Requirements, for general duties and responsibilities of the testing agency and inspectors.

3.03 CONTRACTOR DUTIES AND RESPONSIBILITIES

- A. See Section 01 40 00 – Quality Requirements, for the duties and responsibilities of the Contractor.

3.04 STATEMENT OF SPECIAL INSPECTIONS

- A. See the appended Statement of Special Inspections following this Section, for the scope of building code and AHJ required testing and inspections for this Project.

END OF SECTION

Statement of Special Inspections

Façade Replacement & Addition Portsmouth City Hall

Construction Documents – For Bid Only

February 17, 2017

Project Name Façade Replacement & Addition Portsmouth City Hall
Location: Portsmouth, New Hampshire

Owner: City of Portsmouth
 1 Junkins Avenue, Portsmouth, New Hampshire 03801

Architect of Record (AoR): Chris Drobat, President 603-622-5450
& Registered Design Professional Lavallee Brensinger Architects
in Responsible Charge (RDPIRC): 155 Dow St. Manchester, NH

Structural Engineer of Record (SER): Paul Becker, P.E. 207-879-1838x101
 Becker Structural Engineers Inc

Testing Agency(s) (TA): To Be Determined

Geotechnical Engineer (GE): Judson Zachar, P.E. 603-749-1841
 John Turner Consulting Inc
 19 Dover Street, Dover, NH

Commissioning Agency (CA): To be determined

Specialty Engineer(s) (SE): To be determined

This Statement of Special Inspections is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the International Building Code, 2009 edition.

The firms, agencies, or individuals noted above (hereafter referred to collectively as agents) will perform the structural tests and inspections as specified herein.

The complete set of Construction Documents (Drawings and Specifications) that accompany the application for building permit is to be considered attached to this program as reference material.

This program does not relieve the Contractor of their responsibility to conduct the work in accordance with the requirements of the Construction Documents, the approved Shop Drawings and the New Hampshire State Building Code.

Construction Categories: The following construction categories are included in the Statement of Special Inspections for this Project. Specific tests and inspections required for each designated category are listed on the page noted opposite the category.

<u>Construction Category</u>	<u>Page</u>	<u>Construction Category</u>	<u>Page</u>
Structural Steel Framing	<u>3-4</u>	In-situ Bearing Strata	<u>8</u>
Shear Connectors	<u>3-4</u>	Controlled Fill	<u>8</u>
Steel Joist Framing	<u>3-4</u>	Curtain wall	<u>9</u>
Steel Decking	<u>3-4</u>	Storefront	<u>10</u>
Cast-In-Place Concrete	<u>5-6</u>	Arch, Mech & Electrical Components	<u>12</u>
Masonry	<u>7</u>		
Earthwork	<u>8</u>		

Performance Specifications: The following construction components are designated in the Construction Documents on the basis of a performance specification to be designed by the Contractor's or Subcontractor's registered professional engineer, i.e. Specialty Engineer - SE.

<u>Construction Component</u>	<u>Page</u>
Curtainwall	<u>9</u>
Storefront	<u>10</u>
Aluminum Window	<u>11</u>
Cold Formed Metal Framing	<u>13</u>

Reports: Test and inspection reports prepared by the AOR, SER, TA, GE, and SE will be collected and maintained by the RDPiDC and distributed, according to the procedures established by the Building Official. Prior to the issuance of a certificate of occupancy the RDPiDC will submit a final report to the Owner and Building Official in accordance with the Building Code.

Prepared by the SER:

Name: Paul Becker, P.E.
New Hampshire Professional Engineer Registration # 6258 (Structural)

Signature: _____

Firm: Becker Structural Engineers Inc

Date: _____

Registered Design Professional in Responsible Charge:

Name: Chris Drobat, R.A., AIA
New Hampshire Registered Architect # 3150

Signature: _____

Firm: Lavallee Brensinger Architects

Date: _____

Statement of Special Inspections
 Façade Replacement & Addition Portsmouth City Hall

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Steel Construction (IBC 2009 Section 1704.3) (Specification Sections 051200, 052100 & 053100)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection ^{1,2,3}	Frequency
1. Steel Construction QC Review	<ul style="list-style-type: none"> Review Contractor's field quality control procedures. Review frequency and scope of field testing and inspections. 	Spec. Section 051200	SER	-	Each submittal
2. Fabricator Certifications	<ul style="list-style-type: none"> Review AISC Certified Fabricator Submittals. 	AISC (Fabricator) Certification Standard for Steel Building Structures (STD) or alternate acceptance criteria (per Section 051200 – 1.04 – C – 2)	SER	-	Each submittal
	<ul style="list-style-type: none"> For record and use in field verification 		TA	Periodic	In conjunction with related field visits
3. Materials	<ul style="list-style-type: none"> Review material certifications for conformance to Specifications. 	AISC 360 A3.1 AISC 360 A3.3 & 3.4 Spec. Section 051200	SER	-	Each submittal
	<ul style="list-style-type: none"> For record and use in field verification 		TA	Periodic	In conjunction with related field visits
4. Anchor Rods	<ul style="list-style-type: none"> Review Contractor's as-built survey. Verify that all anchor rods have been properly torqued and have adequate fit-up. 	ASTM F1554 AISC 360 M4 Spec. Section 051200	TA	Periodic	Verify bolt length, projection and condition. Verify "Snug tight" torque for 100% of anchor bolts in braced bays, 20% in all other cases.
5. Bolting	<ul style="list-style-type: none"> Verify bolt size and grade. Test and inspect bolted connections. 	AISC 360 A3.3 & M2.5 Spec. Section 051200 AISC Specification for Structural Joints Using A325 or A490 Bolts	TA	Continuous (Slip-critical) Periodic (Bearing)	As appropriate for connection type and fastener type. Per Construction Documents and AISC specifications.
			SER	-	SER to review conditions identified as critical
6. Welding	<ul style="list-style-type: none"> Check welder qualifications. Check weld identification markings. Test and inspect welds. 	AWS D1.1 Section 6 Spec. Section 051200	TA	<u>Continuous:</u> •Complete and partial penetration groove welds, •Multiple pass fillet welds, •Plug and slot welds •Single pass fillet welds >5/16" <u>Periodic:</u> •Fillet welds ≤ 5/16"	<u>At complete and partial penetration groove welds:</u> Visually inspect and test all welds by ultrasonic or radiographic methods. If for an individual welder, the rejection rate is demonstrated to be five (5) percent or less, the non-destructive testing rate may be reduced to twenty-five (25) percent for the individual welder. The evaluation of the welding shall be based on a sampling of at least forty (40) completed welds and completed by an AWS Certified Weld Inspector. <u>At all other welds:</u> Visually inspect all welds and test as required by magnetic particle, ultrasonic or radiographic methods and shall be completed by an AWS Certified Weld Inspector.
			SER	-	During aperiodic site visits

Statement of Special Inspections
 Façade Replacement & Addition Portsmouth City Hall

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7. Structural Framing, Details, and Assemblies	<ul style="list-style-type: none"> • Check against Construction Documents and latest approved shop drawings. • Inspect for size, grade of steel, camber, installation, and connection details. • Verify steel frame joint details including: <ul style="list-style-type: none"> • Details such as bracing and stiffeners • Moment connections • Joint configurations and locations • Preparation of faying surfaces 	Construction Documents Spec. Section 051200	TA	Periodic	All framing, details, and assemblies.
			SER	-	SER to review conditions identified as critical
8. Expansion & Adhesive Anchors	<ul style="list-style-type: none"> • Review installation procedures for both mechanical anchors and adhesive anchors. • Verify that materials are suitable for job conditions. 	ACI 318 Appendix D Anchor manufacturer's instructions	TA	Periodic	All anchors
			SER	-	Each submittal
9. Steel Decking	<ul style="list-style-type: none"> • Verify gage, depth, and type. • Inspect placement, laps, welds, side lap attachments, and mechanical fasteners • Check welder qualifications. 	SDI Steel Deck Design Manual AWS D1.3 Section 7 Construction Documents Spec. Section 053100	TA	Periodic	All decking and connections, inspection shall be completed by a AWS Certified Weld Inspector.
			SER	-	SER to review conditions identified as critical
10. Field Correction of Fabricated Items	<ul style="list-style-type: none"> • Review documentation of approved repairs and verify completion of repairs. 	Construction Documents Spec. Section 051200	TA	As required, per above	Each repair
			SER	-	SER to review conditions identified as critical

¹Continuous Inspection: Full-time observation of the indicated work by approved individual of the noted Agency, as the work is being performed.

²Periodic Inspection: Part-time or periodic observation of the indicated work by an approved individual of the noted Agency and an inspection of the completed work.

³Aperiodic Inspection: Irregularly scheduled as required or as needed observation of the indicated work by an approved individual of the noted Agency; Principal Inspection responsibility is that of the Testing Agent TA.

Statement of Special Inspections
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Concrete Construction (IBC 2009 Section 1704.4) (Specification Section 033000)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection ^{1,2,3}	Frequency
1. Cast in Place Concrete Construction QC Review	<ul style="list-style-type: none"> Review Contractor's field quality control procedures. Review frequency and scope of field testing and inspections. 	Construction Documents Spec. Section 033000	SER	-	Each submittal
2. Mix Design	<ul style="list-style-type: none"> Review mix designs prior to placement. 	Construction Documents Spec. Section 033000	SER	-	Each submittal
	<ul style="list-style-type: none"> Verify use of approved mix design. 	ACI 318, 1.3.2.A ACI 318, Chapter 4 ACI 318, 5.2-5.4	TA	-	Each concrete placement
3. Materials	<ul style="list-style-type: none"> Review material certifications for conformance to Specifications. 	Construction Documents Spec. Section 033000	SER & TA	-	Each submittal
4. Batching Plant	<ul style="list-style-type: none"> Review plant quality control procedures and batching/mixing methods. 	ACI 304	TA	-	One (1) visit at the start of production & one (1) during the production period. Additional visits may be requested by the SER, if necessary.
5. Reinforcement Installation	<ul style="list-style-type: none"> Use latest set of approved reinforcing bar shop drawings. Inspect reinforcing for grade, size, quantity, spacing, lap lengths, bends, hooks, condition, and placement. Verify adequate cover per specifications. Confirm dowel installation for masonry and concrete, including embedment lengths. 	ACI 318, 1.3.2.C ACI 318, 7.5	TA	Periodic	Each concrete placement
			SER	-	SER to review conditions identified as critical
6. Anchor Rods	<ul style="list-style-type: none"> Inspect anchor rods prior to and during placement of concrete. 	ACI 318 1.3.2.C	TA	Continuous	All anchor rods
			SER	-	SER to review conditions identified as critical
7. Formwork	<ul style="list-style-type: none"> Inspect forms for cleanliness and for proper sizes/locations of concrete members. 	ACI 318 6.1.1	TA	Periodic	Each concrete placement
			SER	-	SER to review conditions identified as critical

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8. Concrete Placement and Sampling of Fresh Concrete	<ul style="list-style-type: none"> Review hot-weather and cold-weather placement procedures submitted by the Contractor. 	ACI 305 ACI 306	SER	-	Each submittal
	<ul style="list-style-type: none"> Verify conformance to Specifications including hot-weather and cold-weather placement procedures. 	ACI 305 ACI 306	TA	-	Each concrete placement
	<ul style="list-style-type: none"> Observe concrete placement operations. Check that total water does not exceed amount in design mix. 	ACI 318, 1.3.2.D ACI 318, 5.9-5.10	TA	Continuous	Each concrete delivery
			SER	-	SER to review conditions identified as critical
	Concrete Strength	ASTM C31, C39 & C172	TA	-	For each strength of concrete, each day, take six (6) standard 6"x12" cylinders for the first placement up to 50 CY. Then take six (6) additional cylinders for every 50 CY thereafter. Take sample from point of discharge and at time fresh concrete is placed. Concrete for each set of cylinders shall be from (1) representative sample of the entire batch.
	Concrete Slump	ASTM C143			
	Concrete Air Content	ASTM C231			
	Concrete Temperature	ASTM C1064			
10. Evaluation of Concrete Strength	<ul style="list-style-type: none"> Test and evaluate in accordance with the Specifications. 	Construction Documents Spec. Section 033000 ACI 214 ASTM C42	TA	-	(1) 7-day & (2) 28-day results. Hold (2) for 56-day results, as needed.
			SER	-	Each submittal
11. Curing and Protection	<ul style="list-style-type: none"> Observe procedures for conformance to the Specifications. 	Construction Documents Spec. Section 033000	TA	Periodic	Each concrete placement
			SER	-	SER to review conditions identified as critical
12. Welding Reinforcing Steel	<ul style="list-style-type: none"> Verify that rebar is ASTM A706 and observe preheating as necessary. 	ACI 318, 3.5.2 ASTM A706 AWS D1.4, Section 7	TA	Continuous	Visual inspection of all welds
13. Mechanical Reinforcing Splices	<ul style="list-style-type: none"> Confirm that the correct, approved couplers are being used. Verify proper embedment, joint fit-up, and tightness of mechanical parts. 	ACI 318, Chapter 12 & Manufacturer's installation instructions	TA	Periodic	Visual inspection of all splices

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⁴TA shall coordinate initial visit with SER to review reinforcing inspection requirements.

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Masonry Construction (IBC 2009 Section 1704.5) (Specification Section 042000)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection ^{1,2}	Frequency
1. Tests Submitted by Contractor for Masonry Units/ Assemblages	<ul style="list-style-type: none"> Review mortar, grout, and prism tests submitted by Contractor. 	Construction Documents Spec. Section 042000 ACI 530.1 Art. 1.5	AOR ²	-	Each class of masonry unit and type of masonry assemblage.
2. Materials Certification	<ul style="list-style-type: none"> Review masonry units, masonry veneers, precast masonry units, and mortar and grout materials. 	Construction Documents Spec. Section 042000 ACI 530.1 Art. 1.4B	AOR ²	-	Each submittal
	<ul style="list-style-type: none"> For record and field verification 		TA		In conjunction with related field visits
3. Testing & Evaluation of Mortar & Grout Strength	<ul style="list-style-type: none"> Sample and test mortar and grout used in field for masonry construction. 	Construction Documents Spec. Section 042000 ACI 530.1 Art. 1.4B	TA	-	For each type of mortar and grout, per every 5,000 square feet of wall surface area: test mortar per ASTM C780 test grout per ASTM C1019
	<ul style="list-style-type: none"> Review test results for mortar and grout. 		AOR ²	-	Each report
4. Proportioning, Mixing, and Consistency of Mortar & Grout	<ul style="list-style-type: none"> Observe field procedures for proportioning and mixing of the mortar and grout to be used in the masonry construction. 	Construction Documents Spec. Section 042000 ACI 530.1 Art. 2.6	TA	Continuous	Once, for each type of grout, at the beginning of masonry construction
			AOR ²	-	AOR to review conditions identified as critical
5. Masonry Installation	<ul style="list-style-type: none"> Inspect and report on installation of masonry units for general configuration and placement. 	Construction Documents Spec. Section 042000 ACI 530.1 Art. 3.3	TA	Periodic	All locations
			AOR ²	-	AOR to review conditions identified as critical
6. Anchorage	<ul style="list-style-type: none"> Inspect type, spacing, and placement of masonry anchors and ties. 	ACI 530 Sections 1.2.2.e & 1.16.1	TA	Periodic	All locations
			AOR ²	-	AOR to review conditions identified as critical
7. Reinforcement Installation	<ul style="list-style-type: none"> Inspect reinforcement for grade, size, quantity, spacing, condition, cover, bar positioners, and placement. 	Construction Documents Spec. Section 042000 ACI 530 Section 1.15 ACI 530.1 Art. 2.4 & 3.4	TA	Periodic	All locations
			AOR ²	-	AOR to review conditions identified as critical
8. Grouting Operations	<ul style="list-style-type: none"> Inspect cells of masonry units for cleanliness prior to grouting. Observe partial/full grouting procedures. 	Construction Documents Spec. Section 042000 ACI 530.1 Art. 2.6B	TA	Continuous	All locations
			AOR ²	-	AOR to review conditions identified as critical
9. Weather Protection	Review submittal on protection of masonry against cold and hot weather.	IBC Sections ACI 530.1 Articles 1.8C & 1.8D	AOR ²	-	Each submittal
	<ul style="list-style-type: none"> Observe protection of masonry against cold and hot weather. 		TA	Periodic	Each masonry placement
10. Anchorage of Exterior Wall Masonry Veneer	<ul style="list-style-type: none"> Inspect type, size, spacing, and placement of approved anchorage to adjacent back-up framing. 	Construction Documents Spec. Section 042000 ACI 530 Section 1.2.2.e	TA	Periodic	All locations
			AOR	-	Each submittal

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Soils (IBC 2009 Section 1704.7) (Specification Section 31 23 15)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection ^{1,2,3}	Frequency
1. Excavation	<ul style="list-style-type: none"> Review existing sub-soils and groundwater conditions during building excavation. 	Construction Documents Spec. Section 320000	GE	Periodic	At each location
2. Bearing Strata	<ul style="list-style-type: none"> Review the in-situ bearing strata and compacted structural fill bearing strata for footings and slabs cast on grade. 	Construction Documents Spec. Section 320000	GE	Periodic	At each location
3. Structural Fill	<ul style="list-style-type: none"> Observe and test compacted structural fill. 	Construction Documents Spec. Section 320000	GE	Continuous	At each location
4. Field Conditions	<ul style="list-style-type: none"> Review existing conditions, procedures and in-situ bearing strata for underpinning. 	Construction Documents Spec. Section 314000	GE	Continuous	At each location
5. Concrete Placement	<ul style="list-style-type: none"> Observe concrete placement operations. 	Construction Documents Spec. Sections 033000 & 314000	GE	Periodic	See Concrete Construction Requirements
6. Earthwork	<ul style="list-style-type: none"> Observe and test excavation and soil placement 	Construction Documents Spec. Section 312000	TA & GE & Contractor	Periodic	Each Submittal & As noted in Construction Documents

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Glazed Aluminum Curtain Walls (IBC 2009 Section 1704.15) (Specification Section 084410)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection ^{1,2}	Frequency
1. Glazed Aluminum Curtainwalls	<ul style="list-style-type: none"> Review supplier's structural design of system. 	Construction Documents Spec. Section 084410	SER	-	Each submittal
2. Material Certification	<ul style="list-style-type: none"> Review materials used. 	Construction Documents Spec. Section 084410	SER	-	Each submittal
	<ul style="list-style-type: none"> For record and use in field verification. 		TA		In conjunction with related field visits
3. Installation of Glazed Aluminum Curtainwalls	<ul style="list-style-type: none"> Inspect type, size, gauge, spacing, and placement of members for conformance to the approved Curtain Wall Shop Drawings and Construction Documents. Inspect member-to-member connections and connections/anchorage to adjacent steel/concrete/wood support elements. 	Construction Documents Spec. Section 084410 Manufacturer's installation instructions	TA	Periodic	All locations
			SE	-	Once during performance of the work and once after completion of the work
4. Field Testing: Water Intrusion	<ul style="list-style-type: none"> Operable Components: AAMA 502. Fixed Components: AAMA 501.2. 	Construction Documents Spec. Section 084410	CA	-	All locations

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Architectural, Mechanical and Electrical Components (IBC 2009 Section 1707) Building Seismic Design Category: C					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection ^{1,2}	Frequency
1. Cladding & Walls	<ul style="list-style-type: none"> Inspection of air and vapor barrier/flashings installation 	-	CA	-	Once during installation of wall systems mock-up.
				-	Once during performance of the work.
				Periodic	Upon the completion of air and vapor barrier/flashings prior to concealment by exterior cladding systems. DO NOT conceal areas without written approval that barrier/flashings have been inspected and approved by CA.

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Cold Formed Metal Framing Construction (IBC 2009 Section 1704.3) (Specification Section 054000)					
Item	Tests / Inspections	Code, Standard, or Document Reference	Agency	Type of Inspection ^{1,2}	Frequency
1. Cold Formed Metal Exterior Wall Stud Backup Framing Design and Cold Formed Metal Roof Truss Design	<ul style="list-style-type: none"> Review supplier's structural design of cold formed metal exterior wall stud backup framing and cold formed metal roof trusses. 	Construction Documents Spec. Section 054000	SER	-	Each submittal
2. Materials Certification	<ul style="list-style-type: none"> Review certification of materials. 	AISI Cold Formed Steel Design Manual Construction Documents Spec. Section 054000	SER	-	Each submittal
	<ul style="list-style-type: none"> For record & field verification 		TA		In conjunction with related field visits
3. Installation of Cold Formed Metal Exterior Wall Stud Backup Framing	<ul style="list-style-type: none"> Inspect type, size, gauge, spacing and placement of cold formed metal exterior wall studs, connections, anchorage, bridging, accessories, etc. for conformance with the approved Shop Drawings and Construction Documents. 	AISI Cold Formed Steel Design Manual Construction Documents Spec. Section 054000	TA	Periodic	All locations
			SE	-	Once during performance of the work and once after completion of the work

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SECTION 01 50 00
TEMPORARY FACILITIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary utilities.
- B. Temporary telecommunications services.
- C. Temporary sanitary facilities.
- D. Temporary Controls: Barriers, enclosures, and fencing.
- E. Security requirements.
- F. Vehicular access and parking.
- G. Waste removal facilities and services.
- H. Project identification sign.
- I. Field offices.

1.02 RELATED REQUIREMENTS

- A. Section 01 00 00 - General Requirements.
- B. Section 01 40 00 - Quality Requirements.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.04 QUALITY ASSURANCE

- A. Comply with NFPA 241 Building Construction and Demolition Operations, ANSI A10 Safety Requirements for Construction and Demolition, AGC and ASC industry recommendations, and other applicable standards.
 - 1. Temporary electrical service shall comply with NECA Temporary Electrical Facilities, NEMA, UL and NFPA 70 National Electric Code.
- B. At the earliest time, when acceptable to the Owner, change over room use of temporary service to use of the permanent service.
- C. Operate temporary service and facilities in a safe and efficient manner, taking necessary fire prevention measures.

1.05 TEMPORARY UTILITIES

- A. Owner will provide the following:
 - 1. Electrical power , consisting of connection to existing facilities.
- B. Provide and pay for all drainage and stormwater, lighting, water, heating and cooling, and ventilation required for construction purposes.
- C. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.06 TELECOMMUNICATION SERVICES

- A. Telecommunications services shall include:
 - 1. Job Site computer dedicated to project telecommunications, with necessary software and laser printer and DSL or faster internet connection.
 - 2. Telephones: Cell phones for all construction field supervisors.
 - 3. E-mail: Account/address reserved for project use.

1.07 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
- B. Use of existing facilities is not permitted.

- C. Maintain daily in clean and sanitary condition.

1.08 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
- C. Provide protection for plants designated to remain. Replace damaged plants.
- D. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.09 FENCING

- A. Construction: Commercial grade chain link fence.
- B. Provide 6 foot high fence around construction site phasing; equip with vehicular and pedestrian gates with locks.
 - 1. Fence perimeter shall be indicated per the Work Phasing Schedule Plan required per Section 01 00 00. As the phasing sequence progresses the Contractor shall update the perimeter fence plan as required to accommodate phase sequence and ensure the safety of workers and the general public. Owner approval of layout is required.

1.10 EXTERIOR ENCLOSURES

- A. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
- B. See Section 01 00 00: Phasing and Work Scheduling for additional related requirements.

1.11 INTERIOR ENCLOSURES

- A. Provide temporary partitions as indicated to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
- B. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces:
 - 1. Where temporary partitions separate Owner occupied areas from unconditioned construction areas insulate partitions to R15.
- C. Paint surfaces exposed to view from Owner-occupied areas.

1.12 SECURITY

- A. Provide security and facilities to protect Work, existing facilities, and Owner's operations from unauthorized entry, vandalism, or theft.
- B. Coordinate with Owner's security program.

1.13 VEHICULAR ACCESS AND PARKING

- A. Comply with regulations relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles.
- B. Coordinate access and haul routes with governing authorities and Owner.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Designated existing on-site roads may be used for construction traffic with prior approval by the Owner.

1. Special Attention: Existing facility and site will remain operational throughout construction. All vehicular access and parking shall be noted on the Work Phase Plan submitted to the Owner for approval prior to start of work. Delivery schedules are to be coordinated with Owner activities to ensure ongoing operations will not be compromised.
 - a. Delivery schedules shall be included within the two week look ahead schedule required per Section 01 00 00.
- F. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.14 WASTE REMOVAL

- A. See Section 01 74 19 - Construction Waste Management, for additional requirements.
- B. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.
- C. Provide containers with lids. Remove trash from site periodically.
- D. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 PROJECT IDENTIFICATION

- A. Provide project identification sign.
- B. Erect on site at location approved by Owner and governing authorities.
- C. No other signs are allowed without Owner permission except those required by law.
- D. Size: 8' x 4' (unless otherwise required by local authorities) The Contractor shall be required to furnish and erect the Project sign complete in all respects, and to dismantle when so instructed by the Owner.
- E. Content: Display names and addresses of the Project, Owner, Architect, and Contractor. Graphics, text, lettering, colors, and location shall be provided by the Architect and approved by the Owner, at a later date.
- F. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors. Do not permit installation of unauthorized signs. No other signs or advertisements shall be displayed on the premises without the approval of the Owner.

1.16 FIELD OFFICES

- A. The Contractor shall provide and maintain an insulated, weather tight, field office at the site. The office shall be of sufficient size to accommodate required office personnel and meeting place for six people. Provide electrical service, heat, lighting, telephone, fax machine, and personal computer, Internet connected with e-mail capability and printer. At a minimum, furnish with a desk and chair for each Superintendent, conference table and chairs, 4-drawer file cabinet, plan table, plan rack, and bulletin board. Equip with a water cooler and first aid cabinet unit. Existing facilities and/or new construction shall not be available for this purpose.
- B. Temporary offices shall be maintained until the issuance of a Certificate of Substantial Completion and shall be removed when no longer required. The Contractor shall pay all costs in connection with the construction, servicing, maintenance, and removal of temporary offices.

1.17 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Date of Substantial Completion inspection.
- B. Remove underground installations to a minimum depth of 2 feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition.

PART 2 PRODUCTS

2.01 PRODUCTS

- A. Tarpaulins: Waterproof, fire-resistant, UL labeled, with flame spread rating of 15 or less.
- B. Water: Potable water.
- C. Fencing: Shall be galvanized two (2) inch chain link fabric not less than six (6) feet high with galvanized steel pipe posts.

PART 3 EXECUTION

3.01 GENERAL

- A. Review locations of temporary facilities, equipment, and storage with the Architect and Owner, for the Owner's approval.
- B. Use qualified personnel for the installation of temporary facilities. Do not remove until facilities are no longer needed, or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

- A. Temporary Water Service: The Contractor shall:
 - 1. Provide and maintain a temporary water service, or install the permanent water service as required for the proper execution of the Work. Such service shall be installed in a manner approved by governing authorities.
 - 2. Pay for the installation and removal of any temporary service, and for all water used throughout the construction period.
 - 3. Pay for permits, if applicable, as required by governing authorities. Obtain easements across private property if required.
 - 4. Extend a supply adequate for all construction purposes and convenient to all trades.
 - 5. Protect lines against freezing and be fully responsible for the temporary installation in every way.
 - 6. Provide backflow preventer(s), vacuum breakers, etc., as required to protect water systems from contamination.
 - 7. Provide any and all hose needed. All service hoses shall be bubble-tight at all times. Trigger operated nozzles shall be used to reduce water waste. No leakage shall be acceptable. Remove all temporary equipment and materials completely upon completion of construction.
 - 8. Repair all damage caused by use of temporary or permanent water services.
- B. Temporary Electrical Services: The Contractor shall provide and maintain temporary light and power for the execution of the Work of this Contract. The existing electrical service may be used for temporary lighting and power providing that it is safe and adequate, and its use is acceptable to governing authorities. Should the Contractor determine that the existing service is not suitable for use as temporary lighting and power, he shall arrange for temporary electric services and pay for all charges of installation and removal of same. Such services shall be installed and maintained in conformance with NEMA, NECA, UL standards for temporary electric service, National Electric Code and in a manner approved by the governing authorities. The Owner will pay monthly user charges throughout the construction period, providing such charges are not excessive or otherwise unreasonable. The Contractor shall:
 - 1. Pay for permits, if applicable, as required by governing authorities. Obtain easements across private property if required. Comply with National Electrical Code, latest edition and applicable local codes and utility regulations.
 - a. An electrical permit from the City of Portsmouth Electrical Inspector is required.
 - 2. Extend from the source a supply of temporary lighting and power adequate for all construction purposes and convenient to all trades.
 - 3. Accept full responsibility for the temporary installation in every way. Remove all temporary equipment and materials completely upon completion of construction.

4. Whenever overhead roof deck has been installed, provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements, without operating the entire system, and will provide adequate illumination for construction operations and traffic conditions. Provide a minimum of one (1) lamp per story at interior stairways and ladder runs, located to illuminate each landing and flight.
 5. Determine that construction use of power will not affect the operation or performance of any equipment or appliances within the existing building.
- C. Temporary Drainage and Storm Water Control: The Contractor shall provide drainage ditches, dry wells, stabilization ponds, and similar facilities. Filter out excessive amounts of soil, construction debris, chemicals, oils and similar contaminants that might clog sewers or pollute waterways before discharge. Maintain temporary drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains. Protect site from puddling or running water. Provide water barriers as required to protect site and abutting properties from soil erosion.
- D. Sanitary Facilities: The Contractor shall provide and maintain in a sanitary condition temporary toilets, wash facilities and drinking water fixtures complying with regulations and health codes for the type, number, location, operation and maintenance of fixtures and facilities.
1. Toilets shall be enclosed, weather-tight chemical type for the use of all construction personnel at locations acceptable to the Owner and governing authorities. Toilet facilities within existing buildings may not be used by construction personnel. Permanent toilets installed under this Contract shall not be used during construction.
 2. Drinking water facilities shall be containerized tap-dispenser bottled water units, with paper cups.
 3. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste container for used materials. Maintain daily in clean and sanitary condition.
- E. Temporary Heat: The Contractor shall provide temporary heat to permit construction work to be carried on during the winter months and as required by construction activities for curing or drying of completed installations or protection of installed construction from adverse effects of low temperatures or high humidity. These Specifications are not to be construed as requiring heat for operations that are not adversely affected by the weather.
1. The Contractor shall maintain a minimum temperature of 40 degrees F at the working surface, unless higher temperatures are required for specific work activities. This provision does not supersede any specific requirements for methods of construction, curing of materials, or the applicable General Conditions set forth in the Contract Documents with added regard to performance obligations of the Contractor.
 2. During the progress of the Work and at all times prior to the date of Substantial Completion, the Contractor shall provide temporary heat as required to prevent damage to completed work, work in progress or stored materials.
 - a. The Contractor shall provide independent temporary heating systems and shall pay all costs, including fuel, related thereto.
- F. Operating labor shall be provided by the Contractor for all heating equipment. Operating labor shall include frequent inspection, emergency repairs, and maintaining temperature records. The Contractor shall provide continuous direct attendance as appropriate or otherwise required by governing authorities.
1. The installation and operation of heating devices used hereunder shall comply with all safety regulations, including provisions for adequate ventilation and fire protection. Select safe equipment that will not have a harmful effect on completed installation or elements being installed. Coordinate ventilation requirement to produce the ambient condition required and minimize consumption of energy. Use of gasoline burning space heaters, open flame, or salamander type heating units is prohibited. Ventilate enclosed

areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes vapors, or gases.

- G. Temporary Ventilation: Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

3.03 TEMPORARY SUPPORT FACILITIES INSTALLATION

- A. Storage Sheds and Trailers: Existing facilities and/or new construction shall not be available for this purpose.
1. All field offices, storage sheds, and trailers located within the construction area, or within 30 feet of building lines shall be of non-combustible construction, complying with requirements of NFPA 241.
 2. Construction shanties, sheds, and temporary facilities provided as required above or for the Contractor's convenience shall be located as approved by the Owner and governing authorities and maintained in good condition and neat appearance.
- B. Temporary Stairs, Lifts, and Hoists: The Contractor shall furnish and maintain all equipment such as temporary stairs, ladders, ramps, scaffolds, runways, chutes, etc., as required for the proper execution of the Work, unless specifically included under the Work of other trades.
1. All such apparatus, equipment, and construction shall meet all requirements of applicable laws, regulations, and standards of safety and good practice.
 2. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the Work shall be furnished, installed, operated, and maintained in safe condition by the Contractor for the use of all subcontractors' material and/or equipment delivered to the designated hoisting area. All costs for such equipment operating services shall be paid by the Contractor.
 3. In the event that a particular subcontractor has certain specific requirements which are peculiar to his needs, and which cannot be satisfied with the hoist provided by the Contractor, the subcontractor shall provide, maintain, operate, and pay for hoisting equipment necessary for the proper execution and completion of his work.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Temporary Fire Protection: Until fire protection needs are supplied by permanent facilities, the Contractor shall provide and maintain in good operating condition temporary fire protection facilities of the types needed to protect against reasonably predictable and controllable fire losses, and as recommended by representatives of the fire insurance company carrying insurance on the Work or by governing fire or building authorities. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations".
1. Flammable products shall be properly stored in containers acceptable to fire officials.
 2. The area within the site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site.
 3. Fire extinguishers shall be located where convenient and effective for their intended purpose, but not less than one extinguisher on each floor.
 4. Maintain unobstructed access to fire extinguishers, temporary fire protection facilities, stairways, and other access routes for fighting fires.
 5. Smoking shall be strictly prohibited on the construction site.
 6. Provide supervision of welding operations, soldering operations, combustion type temporary heating units, and similar sources of fire ignition.
- B. Barricades, Warning Signs and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed provide lighting, including flashing red or amber lights.
- C. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted, or that other undesirable effects might result. Minimize the use of tools and equipment that product

excessive noise and restrict their use to hours that will minimize complaints from persons near the site.

- D. Temporary Enclosures: Provide temporary enclosure for protection of construction in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
1. All cavities of masonry construction and masonry construction containing uncured mortar shall be covered during rainy conditions and at the end of a day's work.
 2. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilation and material drying or curing requirements to avoid dangerous conditions and effects. This protection shall provide adequate working areas during winter months, consistent with the approved construction schedule to permit the continuous progress of all work necessary to maintain an orderly and efficient sequence of construction operations.
 3. Install tarpaulins securely, with non-combustible wood framing and other materials. Close openings 25 sq. feet or less with plywood or similar materials.
 4. Close openings through floor or roof decks and horizontal surfaces with load-bearing temporary construction. Where temporary wood or plywood is used and exceeds 100 sq feet in area, use fire-retardant treated framing and plywood.
- E. Protective Covering of the Work: The Contractor shall protect all finished surfaces, including the jambs and soffits of all openings used as passageways or through which materials are handled, against any possible damage resulting from the conduct of work by all trades.
1. All finished surfaces, including factory-finished and job-finished items, shall be clean and not marred upon delivery of the building to the Owner. The Contractor shall, without extra compensation, refinish all spaces where such surfaces prove to have been inadequately protected and are damaged.
 2. Tight wood sheathing shall be laid under any materials that are stored on or moved over finished surfaces. Reinforced non-staining kraft building paper and plywood or planking shall be laid over all types of finished floor surfaces in traffic areas before moving any material over these finished areas. Wheelbarrows, if used over such areas, shall have rubber-tired wheels.
 3. Roof surfaces shall not be subjected to unnecessary traffic nor shall they be used for storage of material. Wherever such activity must take place in order to carry out the Work of the Contract, adequate protection shall be provided.
 4. Prohibit traffic on grass and landscaped areas.
- F. Temporary Tree and Plant Protection: The Contractor shall provide temporary fencing adequate to properly protect existing trees to remain specifically identified on the Drawings during construction. Fencing shall be located at each tree's drip line in order to protect the tree's root structure as well as its trunk and branches. Damaged trees shall be replaced in-kind at the Contractor's expense.
- G. Worker I.D. Badges: The Contractor shall provide worker I.D. badges for all personnel present on the site involved with the Project. A list shall be maintained in the field office, identifying workers with their assigned badge number. Badges shall be prominently displayed at all times when on-site.

3.05 TERMINATION AND REMOVAL

- A. Remove temporary facilities when the need has ended, or when replaced by authorized use of permanent facilities.
- B. Materials and facilities that constitute temporary facilities are the property of the Contractor.
- C. Repair or replace existing paving and curb areas damaged due to construction activities.

- D. At Substantial Completion, clean and restore permanent facilities that have been used during construction, including but not limited to, replacing air filters, cleaning ductwork, and replacing lamps effected by substantial use.

END OF SECTION

SECTION 01 57 21
INDOOR AIR QUALITY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Construction procedures to promote adequate indoor air quality after construction.
- B. Testing indoor air quality before commencement of construction; existing building areas only.
- C. Testing indoor air quality after completion of construction.

1.02 PROJECT GOALS

- A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
 - 1. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
 - 2. Establish condition of existing ducts and equipment prior to start of alterations.
- B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
 - 1. Furnish products meeting the specifications.
 - 2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.

1.03 REFERENCE STANDARDS

- A. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size; 2012, with 2015 amendments.
- B. ASTM D5197 - Standard Test Method for Determination of Formaldehyde and Other Carbonyl Compounds in Air (Active Sampler Methodology); 2009.
- C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; California Department of Public Health; v1.1, 2010.
- D. EPA 600/4-90/010 - Compendium of Methods for the Determination of Air Pollutants in Indoor Air; April 1990.
- E. EPA 625/R-96/010b - Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air; Jan-99.
- F. SMACNA (OCC) - IAQ Guidelines for Occupied Buildings Under Construction; 2007.

1.04 DEFINITIONS

- A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
- B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
- C. Particulates: Dust, dirt, and other airborne solid matter.
- D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Indoor Air Quality Management Plan: Describe in detail measures to be taken to promote adequate indoor air quality upon completion; use SMACNA (OCC) as a guide.
 - 1. Submit not less than 60 days before enclosure of building.
 - 2. Identify potential sources of odor and dust.
 - 3. Identify construction activities likely to produce odor or dust.

4. Identify areas of project potentially affected, especially occupied areas.
 5. Evaluate potential problems by severity and describe methods of control.
 6. Describe construction ventilation to be provided, including type and duration of ventilation, use of permanent HVAC systems, types of filters and schedule for replacement of filters.
 7. Describe cleaning and dust control procedures.
- C. Interior Finishes Installation Schedule: Identify each interior finish that either generates odors, moisture, or vapors or is susceptible to adsorption of odors and vapors, and indicate air handling zone, sequence of application, and curing times.
- D. Duct and Terminal Unit Inspection Report.
- E. Air Contaminant Test Plan: Identify:
1. Testing agency qualifications.
 2. Locations and scheduling of air sampling.
 3. Test procedures, in detail.
 4. Test instruments and apparatus.
 5. Sampling methods.
- F. Air Contaminant Test Reports: Show:
1. Location where each sample was taken, and time.
 2. Test values for each air sample; average the values of each set of 3.
 3. HVAC operating conditions.
 4. Certification of test equipment calibration.
 5. Other conditions or discrepancies that might have influenced results.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Low VOC Materials: See other sections for specific requirements for materials with low VOC content.
- B. Auxiliary Air Filters: MERV of 8, minimum, when tested in accordance with ASHRAE Std 52.2.

PART 3 EXECUTION

3.01 CONSTRUCTION PROCEDURES

- A. Prevent the absorption of moisture and humidity by adsorptive materials by:
1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
 2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
 3. Provide sufficient ventilation for drying within reasonable time frame.
- B. Begin construction ventilation when building is substantially enclosed.
- C. When working in a portion of an occupied building, prevent movement of air from construction area to occupied area.
- D. Use of HVAC equipment and ductwork for ventilation during construction is not permitted:
1. Provide temporary ventilation equivalent to 1.5 air changes per hour, minimum.
 2. Exhaust directly to outside.
 3. HVAC ductwork shall be kept clean, free of dust during storage, handling and installation. Seal HVAC air inlets and outlets immediately after duct installation with tape and plastic sheeting. All seams in ductwork shall be sealed.
- E. All inspection and filter replacement shall occur with the HVAC equipment turned off.
- F. Do not store construction materials or waste in mechanical or electrical rooms.
- G. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

- H. Use other relevant recommendations of SMACNA (OCC) for avoiding unnecessary contamination due to construction procedures.

3.02 AIR CONTAMINANT TESTING

- A. Contractor's Option: Satisfactory air contaminant testing is required.
- B. Perform air contaminant testing before starting construction, as base line for evaluation of post-construction testing.
- C. Perform air contaminant testing before occupancy.
- D. Do not start air contaminant testing until:
 - 1. All construction is complete, including interior finishes.
 - 2. HVAC systems have been tested, adjusted, and balanced for proper operation.
 - 3. New HVAC filtration media have been installed.
- E. Indoor Air Samples: Collect from spaces representative of occupied areas:
 - 1. Collect samples while operable windows and exterior doors are closed, HVAC system is running normally as if occupied, with design minimum outdoor air, but with the building unoccupied.
 - 2. Collect samples from spaces in each contiguous floor area in each air handler zone, but not less than one sample per 25,000 square feet; take samples from areas having the least ventilation and those having the greatest presumed source strength.
 - 3. Collect samples from height from 36 inches to 72 inches above floor.
 - 4. Collect samples from same locations on 3 consecutive days during normal business hours; average the results of each set of 3 samples.
 - 5. Exception: Areas with normal very high outside air ventilation rates, such as laboratories, do not need to be tested.
 - 6. When retesting the same building areas, take samples from at least the same locations as in first test.
- F. Outdoor Air Samples: Collect samples at outside air intake of each air handler at the same time as indoor samples are taken.
- G. Analyze air samples and submit report.
- H. Air Contaminant Concentration Limits:
 - 1. Formaldehyde: Not more than 27 parts per billion.
 - 2. PM10 Particulates: Not more than 50 micrograms per cubic meter.
 - 3. Total Volatile Organic Compounds (TVOCs): Not more than 200 micrograms per cubic meter.
 - 4. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: Allowable concentrations listed in Table 4-1.
 - 5. Carbon Monoxide: Not more than 9 parts per million and not more than 2 parts per million higher than outdoor air.
- I. Air Contaminant Concentration Test Methods:
 - 1. Formaldehyde: ASTM D5197, EPA 625/R-96/010b Method TO-11A, or EPA 600/4-90/010 Method IP-6.
 - 2. Particulates: EPA 600/4-90/010 Method IP-10.
 - 3. Total Volatile Organic Compounds (TVOC): EPA 625/R-96/010b Method TO-1, TO-15, or TO-17; or EPA 600/4-90/010 Method IP-1.
 - 4. Chemicals Listed in CAL (CDPH SM) Table 4-1, except Formaldehyde: ASTM D5197, or EPA 625/R-96/010b Method TO-1, TO-15, or TO-17.
 - 5. Carbon Monoxide: EPA 600/4-90/010 Method IP-3, plus measure outdoor air; measure in ppm; report both indoor and outdoor measurements.
- J. If air samples show concentrations higher than those specified, ventilate with 100 percent outside air and retest at no cost to Owner.

END OF SECTION

SECTION 01 60 00
PRODUCT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General product requirements.
- B. Re-use of existing products.
- C. Transportation, handling, storage and protection.
- D. Product option requirements.
- E. Substitution limitations and procedures.
- F. Procedures for Owner-supplied products.
- G. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Document 00 21 13 - Instructions to Bidders: Product options and substitution procedures prior to bid date.
- B. Section 01 00 00 - General Requirements.
- C. Section 01 40 00 - Quality Requirements: Product quality monitoring.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project. See Section 01 30 00 - Administrative Requirements, for more information regarding product data submittals.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances. See Section 01 30 00 - Administrative Requirements, for more information regarding Shop Drawings.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.
- C. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by the Contract Documents.
- B. Do not use products made using or containing CFC's or HCFC's.
- C. Where all other criteria are met, Contractor shall give preference to products that:
 - 1. Are extracted, harvested, and/or manufactured closer to the location of the project.

2. Have longer documented life span under normal use.
3. Result in less construction waste.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers with product model: Use a product of one of the manufacturers named; no substitutions if so indicated; substitutions by following substitution procedures.
- C. Products Specified by Naming One manufacturer with other acceptable manufacturers listed without product model: Submit a request for substitution following substitutions procedures.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual Specification Sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION PROCEDURES

- A. Substitutions are changes, modifications or deviations in those products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after the receipt of Bids. Substitutions for the convenience of the Contract or subcontractors, or materials suppliers will only be considered if submitted prior to the receipt of Bids, in strict conformance with the Instructions to Sub-bidders.. The following shall not be considered substitutions:
 1. Changes, modifications, or deviations requested by Bidders during the bidding period and accepted prior to the receipt of Bids shall be considered as included in the Contract Documents and are not subject to the requirements of this Section.
 2. Revisions to Contract Documents requested by the Owner or Architect.
 3. Specified options of products or materials included in the Contract Documents.
 4. The Contractor's compliance with governing regulations and orders issued by governing authorities, subject to the Architect's prior written notice and approval.
- B. Substitution Requests: Request for substitution will be considered only if, in the opinion of the Architect, such substitution will be of benefit to the Owner. Substitution requests after receipt of bids will not be considered solely related to an "or approved equal" clause in the Contract Documents.
 1. The Contractor's substitution request will be considered by the Architect when all of the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action.
 - a. Extensive revision to the Contract Documents are not required.
 - b. Proposed changes are in keeping with the general intent of the Contract Documents.
 - c. The request is timely, fully documented and properly submitted.
 - d. In addition to the above conditions, one or more of the following conditions must be satisfied, as determined by the Architect. The Contractor shall provide written documentation for each condition noted.
 - 1) The specified product cannot be provided within the Contract Time. However, the request will not be considered if the specified product cannot be provided as a result of the Contractor's failure to submit to the Architect or order from the manufacturer in a timely fashion.
 - 2) The specified product cannot receive necessary approval of governing authority and the requested substitution can be approved.
 - 3) A substantial advantage is offered to the Owner, in terms of cost savings, time savings, energy conservation, or other considerations of merit, after deducting

- offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.
- 4) The specified product cannot be provided in a manner that is compatible with or coordinated with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
 - 5) The specified product cannot provide the warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.
- C. Substitution Request Procedure: Complete the Contractor's Substitution Request form provided at the end of this Section. Submit electronically or three (3) hard copies of each request for substitution using the provided form with all required information. Incomplete forms will not be reviewed.
- D. Architect's Action: Within five (5) working days of receipt, the Architect will request additional information to evaluate the substitution if any is required. Within ten (10) working days of receipt of all necessary information, the Architect will notify the Contractor of acceptance or rejection of the proposed substitute. If a decision on the use of a proposed substitute is not or cannot be made or obtained within the time allocated, the Contractor shall use the specified product. Acceptance will be in the form of a Change Order.
- E. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this Section.
- F. A request for substitution constitutes a representation that the submitter:
1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 2. Will provide the same or better warranty for the substitution as for the specified product.
 3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 4. Waives claims for additional costs or time extension that may subsequently become apparent.
- G. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

3.02 OWNER-SUPPLIED PRODUCTS

- A. Owner's Responsibilities:
1. Arrange for and deliver shop drawings, product data, certificates, manufacturer's instructions and samples, to Owner.
 2. Arrange and pay for product delivery to site in accordance with the progress schedule.
 3. On delivery, inspect products jointly with Contractor.
 4. Submit claims for transportation damage and arrange for replacement of damaged, defective, or deficient items.
 5. Arrange for manufacturers' warranties, inspections, and service.
- B. Contractor's Responsibilities:
1. Review Owner reviewed shop drawings, product data, and samples. Submit to the Architect with notification of any observed discrepancies or problems anticipated due to non-conformance with the Contract Documents.
 2. Designating delivery dates for each product in accordance with the progress schedule.
 3. Receive and unload products at site; inspect for completeness or damage jointly with Owner. Record shortages, and damaged or defective items.
 4. Install blocking and supports as required for proper installation.
 5. Handle, uncrate, store, assemble, install, connect, adjust and finish products.
 6. Protecting products from damage and from exposure to the elements.

7. After receipt, repair or replace items damaged the Contractor or persons under his control.
- C. Owner furnished equipment for installation by the Contractor may be indicated on the Drawings, or otherwise identified for the Contractor's information. Concealed wood blocking shall be provided for mounting equipment. See Section 06 10 54. Such equipment shall include, but not be limited to:
 1. Clocks - surface mounted.
 2. TV and monitor mounting brackets - surface mounted.
 3. Interior signage - Surface mounted.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. The Contractor shall be responsible for the proper protection from damage of all materials and equipment prior to and following their incorporation into the Work. Materials and equipment shall be inspected by the Contractor
- D. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- E. Transport and handle products in accordance with manufacturer's instructions.
- F. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- G. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, products are undamaged and if found to be damaged or otherwise unsuitable, shall be promptly rejected.
- H. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- I. Arrange for the return of packing materials, such as wood pallets, where economically feasible.
- J. All materials stored on or off the site shall be kept in secured, weathertight enclosures, and the Contractor shall correct, at no additional cost to the Owner, any damages resulting from his failure to provide proper protection. Such corrective work shall include total replacement if so required by the Architect.
- K. The Contractor shall exercise caution in temporarily loading materials on floors, decks, roofs, etc. It shall be the Contractor's responsibility to determine the size of loads to be imposed and the adequacy of the affected structure to support such loads. The Contractor shall correct, at no additional cost to the Owner, any resultant damages.

3.04 STORAGE AND PROTECTION

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- J. Prevent contact with material that may cause corrosion, discoloration, or staining.
- K. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- L. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

CONTRACTOR'S SUBSTITUTION REQUEST

To Architect: _____ Date: _____

From Contractor: _____ Number: _____

Specification Section: _____ Page: _____

Article / Paragraph: _____

1. Product data for proposed substitution to include: Description of product, reference standards, performance, and test data.

Sample attached: Yes ___ No ___ To be sent if requested by Architect Yes ___ No ___

2. Itemized comparison of proposed substitution with product specified is attached.

	ORIGINAL PRODUCT	PROPOSED SUBSTITUTION
Trade Name, Model:	_____	_____
Manufacturer:	_____	_____
Installer:	_____	_____

History of proposed substitution: New product ___ 2-5 years old ___ 5-10 years old ___ > 10 years old ___

Significant variations of proposed substitution from original product: _____

Proposed substitution affects other parts of the Work: No ___ Yes __, explain _____

Similar installations within 150 miles: Provide project name, address, architect, install date: _____

Reason for not providing specified item: _____

3. Unit costs, if applicable: State if cost is materials only ___ or materials installed ___.

Original product \$ _____ per _____ Substitution \$ _____ per _____

Savings to Owner for accepting substitution: _____ \$ _____

Proposed substitution changes Contract Time: No ___ Yes __ Add/Deduct _____ days.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior to the specified product.
- Same warranty will be furnished for proposed substitution as for the specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated herein is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions, functional clearances or design appearance.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Attachments: _____

SECTION 01 71 00
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Work Included in This Section:
1. Provide all labor, materials, equipment and services, etc., required for all cutting (including excavation), removal, fitting, patching, and/or repairs as required to:
 - a. Make the several parts fit properly.
 - b. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
 - c. Remove and replace work not conforming to requirements of the Contract Documents.
 - d. Remove and replace defective work.
- B. Related Work:
1. In addition to other requirements noted or specified, upon the Architect's request uncover work to provide for observation by the Architect of covered work, and remove samples of installed materials for testing.
 2. Do not cut or alter work performed under separate contracts without the Architect's written permission.

1.02 SUBMITTALS

- A. Where cutting and/or patching is required, the Architect's review of proposed cutting and patching procedures is required. The following information shall be included in the submission prior to proceeding with cutting:
1. Clearly describe the extent of cutting and patching required and how it is to be performed. Layout the work on-site as appropriate. Indicate why it cannot be avoided.
 2. Describe the anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components and changes in the building's appearance and other visual elements.
 3. List products to be used and firms that will perform the Work. Indicate dates for cutting and patching. Submit samples of actual materials to be used for patching.
 4. List any utilities that will be disturbed, relocated, made temporarily out-of-service, and indicate the length of service disruption.
 5. Where cutting and patching involves the addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.
- B. Acceptance of the cutting and patching proposal by the Architect does not waive the Architect's right to later require complete removal and replacement of Work found to be unsatisfactory, nor does it alter the Contractor's sole responsibility for the safe and proper execution of all cutting and patching.
- C. Submit written notice to the Architect designating the time the Work will be uncovered, to provide for the Architect's observation.

1.03 QUALITY ASSURANCE

- A. Structural Work: Do not cut and patch structural elements in a manner that would reduce their structural characteristics such as load-carrying capacity or load deflection ratio.
1. Obtain approval of the cutting and patching proposal before cutting and patching structural elements, including but not necessarily limited to:
 - a. Foundation construction.
 - b. Bearing and retaining walls.
 - c. Structural concrete.
 - d. Structural steel.
 - e. Lintels.

- f. Structural decking.
 - g. Stair systems.
 - h. Miscellaneous structural metals.
 - i. Equipment supports.
 - j. Piping, ductwork, vessels, and equipment.
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety components in a manner that would reduce their capacity to perform as intended, or would increase maintenance, or decrease operational life or safety.
- 1. Obtain approval of the cutting and patching proposal before cutting and patching operating elements or safety related systems, including but not necessarily limited to:
 - a. Shoring, bracing, and sheeting.
 - b. Primary operational systems and equipment.
 - c. Firewalls and fire separation assemblies.
 - d. Fire-rated and non-fire-rated smoke barriers.
 - e. Water, moisture, or vapor retarders.
 - f. Membranes and flashings.
 - g. Fire protection systems.
 - h. Sprayed-on Fireproofing.
 - i. Noise and vibration control elements and systems.
 - j. Control systems.
 - k. Voice, video, and data systems.
 - l. Electrical wiring systems.
- C. Remove, replace, patch and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. For replacement of items removed, use materials identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible. Use materials whose performance will equal or surpass that of existing materials.

2.02 PAYMENT FOR COSTS

- A. Perform cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.
- B. All costs resulting from ill-timed or defective work, or work otherwise not conforming to the Contract Documents shall be borne by the Contractor.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

- A. Inspection: Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling.
- B. After uncovering the work, inspect conditions affecting installation of new work.
- C. Prior to proceeding, meet with all parties involved in cutting and patching including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Discrepancies: If uncovered conditions are not as anticipated, immediately notify the Architect and secure needed directions. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.
- B. Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Work that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas. Take all precautions to avoid cutting existing pipe, conduit, or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.
- D. Provide proper dirt, dust, fume, vapor, and noise control.
- E. Verify the conditions and requirements of all existing warranties that may be affected by cutting and patching (such as roofing warranties). It is the intent that all cutting and patching be performed in a manner that preserves all such warranties in full, without compromise.

3.03 PERFORMANCE

- A. General: Cutting and patching shall be kept to an absolute minimum by careful planning and through proper holes, sleeves, anchors, inserts, or other built-ins as the Work progresses.
- B. Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
- C. The Contractor shall properly restore work that has been cut or removed and install new products to provide completed work in accordance with the requirements of the Contract Documents. Existing surfaces shall be restored to their original condition.
- D. Cutting: Perform cutting and demolition by methods least likely to damage elements to be retained or adjoining construction and that will provide proper surfaces to receive installation of repair and new work. Where possible, review procedures with the original installer. Comply with the original installer's recommendations.
- E. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- F. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
- G. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
- H. Perform necessary excavating and backfilling as required under pertinent other Sections of these Specifications.
- I. By-pass utility services such as pipe or conduit, before cutting, where services are shown, or removal required, relocated, or abandoned. Cut off pipe or conduit in walls or partitions, to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- J. Patching: Perform fitting and adjusting of products as required to provide finished installations complying with the specified tolerances and finishes or otherwise satisfactory to the Architect.
- K. Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
- L. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
- M. Where the removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.

- N. Where patching occurs in a smooth painted surface, extend final paint coat over the entire unbroken surface containing the patch, after the patched area has received primer and first coat.
- O. Patch, repair, or re-hang existing ceilings, as necessary to provide an even plane surface of uniform appearance.
- P. At penetrations in fire-resistive rated walls, partitions, ceilings, floors, or roof construction, completely seal voids with firestopping materials in compliance with Section 07 84 00 - Firestopping.

3.04 CLEAN-UP

- A. All debris and rubbish shall be properly removed from the premises as it occurs. All materials shall be properly disposed of off-site, in strict accordance with all applicable Laws, Rules, Regulations, and Ordinances.
- B. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean surfaces before painting or finishing.

END OF SECTION

SECTION 01 74 19
CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

- A. Owner requires that this project generate the least amount of trash and waste possible.
- B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.
- C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.
- D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
 - 1. Aluminum, glass and plastic beverage containers.
 - 2. Corrugated cardboard.
 - 3. Wood pallets.
 - 4. Clean dimensional wood .
 - 5. Land clearing debris, including brush, branches, logs, and stumps; see Section 31 10 00 - Site Clearing for use options.
 - 6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - 7. Acoustical ceiling tile and panels.
- E. Demolition debris shall be sent to a certified recycling facility for sorting to recycle, reuse and remainder to landfill. It is expected that at least 75% of loads shall be diverted from landfills.
- F. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.
- G. Methods of trash/waste disposal that are not acceptable are:
 - 1. Burning on the project site.
 - 2. Burying on the project site.
 - 3. Dumping or burying on other property, public or private.
 - 4. Other illegal dumping or burying.
 - 5. Incineration, either on-site or off-site.
- H. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 DEFINITIONS

- A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.
- B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.
- C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.
- D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.
- E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.
- F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

- G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.
- H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- I. Return: To give back reusable items or unused products to vendors for credit.
- J. Reuse: To reuse a construction waste material in some manner on the project site.
- K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.
- L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.
- M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.
- N. Toxic: Poisonous to humans either immediately or after a long period of exposure.
- O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.
- P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Submit Waste Management Plan within 10 calendar days after receipt of Notice of Award of Bid, or prior to any trash or waste removal, whichever occurs sooner; submit projection of all trash and waste that will require disposal and alternatives to landfilling.
- C. Waste Management Plan: Include the following information:
 - 1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
 - 2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of landfill disposal of all non-recycled project trash/waste.
 - 3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
 - a. List the local market for each material.
 - 4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
 - 5. Designation of the party who will be responsible for implementing the plan.
- D. Monthly Reports: The certified recycling facility shall submit monthly reports of all project demolition debris and construction waste removed, recycled and landfilled. The report shall include:
 - 1. Date, disposal ticket #, materials type, total weight of the load, weight of material recycled from the load, % of materials recycled, materials destinations, tipping fees and disposal cost.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: Designate a person who will be responsible for implementing the plan, instructing workers, coordinating waste materials handling, any on-site separation requirements for all trades and overseeing and documenting results of the Waste Management Plan.

- B. Communication: Distribute copies of the Waste Management Plan to job site superintendent, each subcontractor, Owner, and Architect.
- C. Facilities: Provide specific facilities for on-site containment and transportation of demolition debris and construction waste materials to off-site recycling and disposal facility for use by all contractors and installers
 - 1. Provide containers as required.
 - 2. Provide adequate space for pick-up and delivery of containers.
 - 3. Keep trash/waste bin areas neat and clean.
- D. Do not handle, separate, store, salvage, or recycle hazardous materials. Contact Owner if hazardous materials are encountered.

END OF SECTION

SECTION 01 78 00
PROJECT CLOSE-OUT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Substantial Completion procedures.
 - 1. Project Close-out meeting.
 - 2. Occupancy Permit.
- B. Project Record Documents.
 - 1. Record Drawings.
 - 2. List of Subcontractors and material suppliers.
 - 3. Operation and Maintenance Data.
 - 4. Warranties and bonds.
 - 5. Contractor's Certificate of No Hazardous Materials.
 - 6. Testing Agency Final Report.
 - 7. Air-Quality Final Report.
- C. Architect's evaluation of the Work.
- D. Final Acceptance procedures.
- E. Operating and Maintenance Instructional Sessions.
- F. Adjustments.
- G. Final Cleaning.

1.02 RELATED REQUIREMENTS

- A. Section 00 72 00 - General Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 00 00 - General Requirements.
- C. Section 01 00 30 - Electronic Media: Record Drawing backgrounds.
- D. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- E. Section 01 40 00 - Quality Services: Final Test Reports.
- F. Section 01 78 10 - Warranties: General warranty requirements.
- G. Individual Product Sections: Specific requirements for operation and maintenance data.
- H. Individual Product Sections: Warranties required for specific products or Work.

1.03 SUBSTANTIAL COMPLETION PRELIMINARY PROCEDURES

- A. Prior to requesting evaluation of the Work for certification of Substantial Completion, the Contractor shall complete the following items.
- B. Close-out Meeting: Not less than thirty (30) days prior to the anticipated date of Substantial Completion, the Contractor shall conduct a Project close-out meeting. Participants in the meeting shall include the Contractor, subcontractors, , Owner and Architect. The Contractor shall prepare the agenda and schedule of close-out tasks, for prior distribution, which, among other items as may be determined by the Contractor, shall include the following:
 - 1. HVAC Start-up Activities.
 - 2. Programming of Energy Management System
 - 3. Indoor Air Quality Testing (as applicable)
 - 4. Testing and Inspections with Authorities Having Jurisdiction:
 - a. Fire alarm system test
 - b. Sprinkler system testing
 - c. Certificate of Occupancy inspection

5. Other Testing.
 - a. Security system
 6. Owner's Equipment Testing.
 - a. Telephone equipment
 - b. Computer network equipment
 - c. Audio-visual equipment
 7. Delivery of tools, spare parts, extra stock, etc.
 8. Punch Lists:
 - a. Contractor
 - b. Architect / Owner
 9. Final Cleaning Operations.
 10. Transition Security Issues.
 - a. Removal of construction trailers, fencing, gates, etc.
 - b. Door key change-over
 11. Transition Issues.
 - a. Insurance change-over.
 - b. Owner's schedule for move-in of furnishings and equipment
 12. Instructional Sessions:
 - a. Mechanical, sprinkler and electrical systems.
 13. Record Information:
 - a. Warranty binder
 - b. Record Drawings
 - c. O&M manuals
 14. Close-out Paperwork:
 - a. Release of Liens
 - b. Consent of Surety
 - c. Certification of No Hazardous Materials
 - d. Testing Agency Final Report
 - e. Air Quality Certification
- C. Adjust Contract Amount by Change Order to assess Owner for additional cost or savings due to increase or decrease in:
1. Savings accrued under the Guaranteed Maximum Price.
- D. Contractor's Punch List: Prior to preparation of a punch list by the Owner and Architect, the Contractor shall prepare his own comprehensive punch list, and along with his subcontractors, properly complete all Work items thereon. The receipt of the Contractor's written punch list, clearly identifying all completed and pending items, shall be considered a prerequisite for the commencement of the Owner and Architect's evaluation of the Work for Substantial Completion.
- E. Advise Owner of pending insurance and utility change-over requirements.
- F. Submit warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
- G. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities, including Occupancy Permits, operating certificates and similar releases. If the Project is completed in phases, obtain Occupancy Permits as required by governing authorities.
- H. Deliver tools, spare parts, extra stock, and similar items.
- I. Make final change-over for locks, keys, and other security provisions.
- J. Complete start-up testing of equipment and systems, conduct Owner's training sessions.
- K. Discontinue, change over and remove temporary facilities from the site. Remove temporary protection measures provided during construction.
- L. Final Cleaning.

- M. Certificate of Occupancy: The Contractor shall schedule various inspections with the Authority Having Jurisdiction as required to obtain a Certificate of Occupancy.

1.04 SUBMITTALS

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
1. Record Drawings: Shall be required for all Site Utilities, Site Drainage, Architecture, Building Structure, Mechanical Systems, Fire Protection Systems and Electrical Systems.
 - a. The Contractor shall maintain one set of Contract Drawings for use in the preparation of Record Drawings. This set shall be maintained at the site, and upon them, the Contractor shall clearly and accurately record all Addenda, Supplementary Instructions, Change Orders, Architect's responses to Contractor's Requests for Information, and all significant changes made during construction to the Work hereinafter listed.
 - b. Upon completion of the Contract, and as a prerequisite to final Payment, the Contractor shall prepare (draft as necessary), check, and certify the Record Drawings for completeness and accuracy and submit them to the Architect. The Contractor's submittal shall include one set of CD Rom electronic media files and one set blackline hard copy Record Drawings. The Contractor shall imprint the following text on each Record Drawing and Record Drawing Electronic Media File:
 - 1) NOTE: This drawing has been produced by (name and address of contractor). It is not the originally designed Contract Document. It is a Record Drawing."
 - 2) See Section 01 00 30 - Electronic Media for information regarding obtaining electronic Contract Documents for use in preparing for Record Drawings.
 - c. The Architect will casually review such drawings, but will in no way ascertain or certify their completeness or correctness, which shall remain the sole responsibility of the Contractor. The Architect shall be entitled to rely upon the thoroughness and accuracy of the Contractor's documents, without further verification. Following his review, the Architect will forward all Record Drawings to the Owner for his use.
 2. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Complete miscellaneous records, place in good order, properly identified and bound ready for reference and submit to the Architect for the Owner's records.
 3. List of Subcontractors: The Contractor shall submit to the Architect two (2) typed updated lists of all subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.
- B. Operation and Maintenance Data:
1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
 2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
 3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
 4. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
1. The Contractor shall submit to the Architect two (2) typed sets, neatly bound and indexed in a loose leaf binder, of all warranties, certificates and bonds as required by the Contract Documents.
 2. For equipment or component parts of equipment put into service during construction with Owner's permission, submit a copy of documents within 10 days after acceptance.
 3. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.

4. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period. Pages shall be pre-punched for insertion into the bound set.

1.05 ARCHITECT'S EVALUATION

- A. On receipt of a written request from the Contractor, the Architect will either proceed with evaluation of the Work for Substantial Completion or advise the Contractor of requirements yet to be completed prior to evaluation.
- B. Based on his/her observations, the Architect will provide a written list, or "Punch List", of items to be corrected or to be completed. The Architect's list may not include all Work necessary for completion in accordance with the Contract Documents and shall not in any way relieve the Contractor of responsibility for compliance with the Contract Documents.
- C. The Architect shall prepare the AIA G704 Certificate of Substantial Completion form and attach his/her written evaluation list thereto.
- D. Additional Work found to be incomplete or not in conformance with the Contract Documents after the Architect's evaluation shall be completed or corrected before Final Acceptance and Final Payment.
- E. When Work has been completed or corrected, the Contractor shall submit to the Architect a written request for re-evaluation. Include a copy of the Architect's previous evaluation report with notation of action taken for each item.

1.06 FINAL ACCEPTANCE

- A. Within five (5) working days after the date of Substantial Completion, the Contractor shall provide a list of final Contract requirements with anticipated completion dates including:
 1. List of incomplete Work.
 2. Final Change Orders.
 3. Consent of Surety to final payment
 4. Assurances that unsettled claims will be settled.
 5. Record Drawings, O& M Manuals, Final Project Photos, Damage or Settlement Survey or other final record information.
 6. Final Application for Payment with releases and supporting documentation, including final waivers of lien.
 7. Written confirmation that corrective work related to any failed quality control testing has been provided, and that satisfactory retesting has been performed and approved by the testing agency.
- B. Re-evaluation Procedure: The Architect will re-evaluate the Work upon receipt of written notice from the Contractor that the Work, including correction of items previously noted, has been completed.
 1. Upon completion of re-evaluation, the Architect will prepare a Certificate of Final Acceptance, or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for Final Acceptance.
 2. If necessary, re-evaluation for Final Acceptance will be repeated. Cost of re-evaluation will be the responsibility of the Contractor.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INDOOR AIR QUALITY MANAGEMENT

- A. The Contractor and his various subcontractors as he may direct shall implement the procedures throughout construction in an effort to improve indoor air quality during the Owner's occupancy. See 01 57 21 - Indoor Air Quality Controls.

3.02 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
 - 1. Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
 - 1. Changes made by Addenda and modifications.
- F. Record Drawings : Legibly mark each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finish first floor datum.
 - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 3. Field changes of dimension and detail.
 - 4. Details not on original Contract drawings.

3.03 OPERATION AND MAINTENANCE DATA

- A. Source Data: For each product or system, list names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
- B. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- C. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- D. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

3.04 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES

- A. For Each Product, Applied Material, and Finish:
 - 1. Product data, with catalog number, size, composition, and color and texture designations.
- B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.
- C. Additional information as specified in individual product specification sections.
- D. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

3.05 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS

- A. For Each Item of Equipment and Each System:
 - 1. Description of unit or system, and component parts.
 - 2. Identify function, normal operating characteristics, and limiting conditions.
 - 3. Include performance curves, with engineering data and tests.
 - 4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.
- E. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- F. Provide servicing and lubrication schedule, and list of lubricants required.
- G. Include manufacturer's printed operation and maintenance instructions.
- H. Include sequence of operation by controls manufacturer.
- I. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- J. Provide control diagrams by controls manufacturer as installed.
- K. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- L. Include test and balancing reports.
- M. Additional Requirements: As specified in individual product specification sections.

3.06 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS

- A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.
- B. Where systems involve more than one specification section, provide separate tabbed divider for each system.
- C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.
- D. Prepare data in the form of an instructional manual.
- E. Binders: Commercial quality, 8-1/2 by 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size. When multiple binders are used, correlate data into related consistent groupings.
- F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.
- G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.
- H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.
- I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.
- J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.
- K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages, house in plastic sleeves.
- L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.
- M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:

1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
 - a. Significant design criteria.
 - b. List of equipment.
 - c. Parts list for each component.
 - d. Operating instructions.
 - e. Maintenance instructions for equipment and systems.
 - f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
 - a. Shop drawings and product data.
 - b. Air and water balance reports.
 - c. Certificates.

3.07 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Provide spare parts, maintenance, and extra products in quantities as specified in individual Specification Sections. Deliver to the site and place in locations as directed by the Owner. Obtain receipts signed by Owner's Representative and submit copies to the Architect if so directed.

3.08 WARRANTIES AND BONDS

- A. See Section 01 78 10 : Warranties, for additional information.
- B. Retain warranties and bonds until time specified for submittal.
- C. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- D. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- E. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- F. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

3.09 CERTIFICATE OF NO ASBESTOS

- A. See Section 01 30 00 - Administrative Requirements, for requirements for submission of Certificate(s) of No Asbestos.

3.10 FINAL TESTING REPORTS

- A. See Section 01 40 00 - Quality Services, for requirements for the Testing Agency's Final Report.

3.11 OPERATING AND MAINTENANCE INSTRUCTIONS / OWNER TRAINING

- A. Instructions: The Contractor and his subcontractors and suppliers shall jointly, thoroughly instruct the Owner's representative and maintenance personnel in the proper maintenance and operation of all materials and systems that require training for proper operation and/or regular maintenance as follows:
 1. Demonstrated and written detailed instructions shall be provided and reviewed for materials and systems listed in Substantial Completion Preliminary Procedures paragraph of this Section, shall include, but not be limited to:

- a. Start-up and Shut-down procedures.
 - b. Emergency operations.
 - c. Noise and vibration adjustments.
 - d. Control sequences.
 - e. Trouble-shooting.
 - f. Safety procedures.
 - g. Maintenance manuals.
 - h. Maintenance agreements.
 - i. Warranties.
 - j. Record Drawings.
 - k. Tools, spare parts, lubricants.
 - l. Cleaning, economy and efficiency adjustments.
 - m. Fuels, and fuel conversion, if applicable.
 - n. Identification systems.
 - o. Hazards. Any operations that, if improperly performed, might endanger the building's occupants or damage the building's equipment or contents.
2. Video all demonstrations of operation and maintenance sessions, which shall be held at the completed facility to instruct the Owner in the proper operation of equipment and systems. Prior to final payment, deliver two (2) copies to the Architect for forwarding to the Owner.
 3. The Contractor shall obtain sign-off from the Owner for meeting with each installer or manufacturer's representative.
 4. For equipment or systems requiring seasonal operation perform demonstrations for the other season within six (6) months.

3.12 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operation. For testing, adjusting and balancing of HVAC systems see Division 25 - Mechanical.

3.13 FINAL CLEANING

- A. Final Cleaning: Upon the completion of the Work, the Contractor shall remove all tools, scaffolding, surplus materials, debris, and shall leave the Work "broom clean" or its equivalent. In addition to general broom cleaning, the Contractor shall employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Use products that are non-hazardous. Cleaning shall be in compliance with requirements of Section 01 73 40 - Indoor Air Quality and with all manufacturer's written instructions. The following cleaning shall be done just before inspection for certification of Substantial Completion and final acceptance of the Work:
 1. Transparent Materials: Clean mirrors and glazing in doors and windows; remove paint and glazing compounds that are noticeably vision obscuring; wash and polish, taking care not to scratch materials. Replace chipped, scratched, or broken materials.
 2. Ceiling and Wall Surfaces: Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, marks, fingerprints, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Carefully clean (vacuum) fabric type surfaces as recommended by manufacturer. Generally clean as required to leave in first class condition.
 3. Flooring: Remove all temporary protection; remove all spots, soil and paint; and clean, shampoo, wax, and buff, etc. all ceramic tile, resilient flooring, base, and other floors in accordance with manufacturer's recommendations. Leave concrete floors broom clean. Vacuum carpeted surfaces.
 4. Hardware: Clean and polish all hardware for all trades; this shall include removal of all paint stains, dust, dirt, etc.
 5. All fixtures, equipment, doors, and door and window frames: Clean all surfaces per manufacturer's instructions, removing all stains, paint, dirt and dust.

6. Labels: Remove all labels that are not permanent.
7. Mechanical and Electrical Equipment: Wipe surfaces of equipment to be free of paint, dirt, and dust. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps. Replace burned-out lamps.
8. Roofs: Clean debris from roofs, scuppers, and drainage systems.
9. Site: Clean the building site and surrounding ground. All trash and rubbish shall be removed and properly disposed of off-site and in accordance with Section 01 74 19 Construction Waste Management. Sweep paved areas broom clean and remove stains and spills. Rake disturbed grounds that are neither paved nor planted, to a smooth even-textured surface.

END OF SECTION

SECTION 01 78 10
WARRANTIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for warranties.

1.02 RELATED SECTIONS

- A. Section 01 00 00 - General Requirements.
- B. Section 01 78 00 - Project Close-out.
- C. Divisions 2 through 28 for specific Section requirements.

1.03 GENERAL

- A. Manufacturers' disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- B. "Standard Product Warranties" are preprinted written warranties published by individual manufacturers of particular products and are specifically endorsed by the manufacturer to the Owner.
- C. "Special Warranties" are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and has been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. Owner's Right of Refusal: The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.
- F. Commencement Date of Warranties: The Date of Substantial Completion designates the commencement date for warranties unless specifically indicated otherwise.
 - 1. Commencement of warranties for items not accepted shall not begin until after items have been accepted.

1.05 SUBMITTALS

- A. Submit written warranties and bonds to the Architect in conformance with Section 01 78 00 - Project Close-out.
- B. When a special warranty is required from the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Architect for review by the Owner prior to final execution.
- C. Form of Submittal: At Final Completion, compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer.
 - 1. Verify the documents are in proper form, contain full information, and are notarized. Co-execute warranties when required.

1.06 SCHEDULE OF GUARANTEES, WARRANTIES, AND BONDS

- A. Guarantee: The Contractor shall guarantee the entire Work to be free from defective or improper work or materials, and shall make good any damage due to such work or materials for a term of one year from the date of the satisfactory completion and acceptance of the Work. In general the commencement date for warranties and guarantees shall be the date of Substantial Completion. Under no circumstances shall any warranties or guarantees for any individual or collective materials or items of equipment commence prior to the date of Substantial Completion. Extended guarantees or warranties shall be provided as specified elsewhere.
- B. Provide guarantees, warranties, and bonds on products and installations as specified in individual Sections.

END OF SECTION

SECTION 02 32 10
SUBSURFACE EXPLORATIONS

PART 1 - GENERAL

1.01 GEOTECHNICAL REPORT AND SAMPLES

- A. On February 16, 2017, soils investigations (test borings) were conducted and a report prepared for the Owner by Judson Zachar P.E. of John Turner Consulting Inc, Dover, New Hampshire. This report, titled "Proposed Portsmouth Police Station Addition, 1 Junkins Avenue, Portsmouth New Hampshire", dated March 10, 2017, was provided for the use of the Architect in the design of the Project. Part of the information contained in this report is interpretive (not factual) and therefore shall not be considered as part of the information available to others. This report has been attached at the end of this specification and is available for viewing at the City's Website: <http://www.cityofportsmouth.com/finance/purchasing.htm>.

1.02 SUBSURFACE CONDITIONS

- A. Factual subsurface information, boring logs, test pit logs and grain size distribution report, are part of the geotechnical report. The logs describe subsurface conditions encountered at the exploration locations at the time explorations were made. Actual subsurface conditions may vary due to conditions not evident at the time explorations were made. No warranties, expressed or implied, are made as to accuracy of subsurface information provided herein.
- B. No warranty is made of the continuity of strata or material between the exploration locations. The stratification lines on the logs represent approximate boundaries between soil types. The actual transitions between soil types may be gradual.
- C. Water level readings have been observed in the drill holes at times and under conditions stated on the boring logs. It must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of drilling when the measurements were made.
- D. Boring and test pit locations shown on the drawings are approximate only and the Owner and Architect, including their consultants, make no representations regarding correctness of such information.
- E. Bidders shall make their own deductions of subsurface conditions which may affect methods or cost of construction. Bidders may, at their own expense, and upon application to the Owner, conduct additional subsurface testing.

1.03 USE OF DATA

- A. These investigations were obtained by the Owner only for the Architect's use in design, and are not a part of the Contract Documents. It is understood that neither the Owner, Architect, nor their engineering consultants shall be responsible for any interpretations or conclusions drawn there from by Bidders or the Contractor with regard to the interpretive data or geotechnical report. The Owner and Architect, including their engineering consultants, claim no responsibility for or endorsement of any construction methods, means, or techniques which may be contained in or implied by the above referenced logs and report.
- B. Bidders shall visit the site and familiarize themselves with all existing conditions. Prior to bidding, Bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but all such investigations shall be performed under time schedule and arrangements approved in advance by the Owner.
- C. The Owner and Architect, including their consultants, cannot guarantee the continuity of subsurface conditions between test locations. The Owner and Architect, including their consultants, cannot guarantee the accuracy or completeness of related documents and reports.
- D. The Contractor must interpret the subsurface data relying upon his own judgement and acknowledges that he is not relying upon the information in the geotechnical report to accurately describe the subsurface conditions that may be found to exist.

- E. It is expressly understood that the Owner and Architect, including their consultants, shall not be responsible for any deduction, interpretation, or conclusion made by any Bidder or Contractor.
- F. No claim for extra cost or extension of time resulting from the Bidder or Contractor's deductions, interpretations, or conclusions shall be allowed.

END OF SECTION

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 alterations purposes and as otherwise required for the complete and proper execution of the Work.
- C. The Work of this Section is not necessarily fully represented on the Drawings or specifically identified herein. The Contractor, either himself or through his various subcontractors, shall thoroughly review all available documents and shall visit the site and existing building prior to bidding, as required to fully satisfy himself as to the types, locations and quantities of demolition work required for the complete and proper execution of the Work. No pleas of misunderstanding resulting from the failure to adequately inspect existing conditions will be entertained and no additional expenses related thereto will be granted. Review phasing requirements and Owner use and occupation of the building and site throughout construction. Coordinate demolition with temporary relocation of existing building and site built utilities, security system equipment, lighting and similar elements critical to the Owner's use of both the building and site area.

1.02 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
- B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Site Plan: Showing:
 - 1. Areas for temporary construction and field offices.
- 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.

1.04 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: Company specializing in the type of work required.
 - 1. Minimum of 5 years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS

- A. For replacement of Work removed, use materials that comply with the pertinent Sections of these Specifications. All other materials, not specifically described but required for a complete and proper job, shall be as selected by the Contractor, subject to the approval of the Architect.

PART 3 EXECUTION

3.01 SPECIAL REQUIREMENTS FOR DEMOLITION

- A. All methods, techniques and procedures of safety, shoring, barricading, fencing, protection, demolition, removal and disposal are left solely to the discretion of, and shall be the

responsibility of the Contractor. Special attention shall be paid to the issues of safety and protection of existing construction and/or landscaping and site improvements to remain. The Contractor shall take all precautions necessary to prevent the movement, settlement, or failure of adjacent construction. See Section 01 00 00 - General Requirements, for additional information.

- B. The Contractor shall be responsible for compliance with all applicable Local, State and Federal environmental regulations, including but not limited to the National Emission Standard for Hazardous Air Pollutants, as enforced by the United States Environmental Protection Agency. It shall be the Contractor's responsibility to provide all inspections and notifications related thereto.

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 and pay for all required permits and approvals required for demolition, hauling, dumping and in general, all activities related to the Work of this Section.
 - 2. Comply with applicable requirements of NFPA 241.
- B. The Contractor shall be alert to potential problems or dangerous conditions. He shall exercise caution during demolition or removal which may affect structural safety. He shall proceed only when he has fully satisfied himself that he has provided proper support, shoring, bracing, protection, and safety precautions.
 - 1. NOTE: Conditions of the existing foundation walls, party walls, and roofing/flashings, which abut scope of work area, shall be thoroughly investigated prior to proceeding with demolition. The Contractor shall employ all measures necessary to ensure the preservation of the integrity of the existing abutting building to remain.
 - 2. If uncovered conditions are not as anticipated, immediately notify the Architect and secure needed directions. Do not proceed in areas of discrepancy until all such discrepancies have been fully resolved
 - 3. 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.
 - 4. Provide, erect, and maintain temporary barriers and security devices.
 - 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
 - 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 7. Do not close or obstruct roadways or sidewalks without required permit(s) and Owner approval.
 - 8. 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.
 - 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- C. Do not begin removal until receipt of notification to proceed from Owner.
 - 1. Prior to notification to proceed the Contractor shall schedule a pre-demolition site walk through with the Owner. The intent of the walk through is to identify potential built elements required to be salvaged.
- D. Do not begin removal until built elements to be salvaged or relocated have been removed.
- E. 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.

- F. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- G. Following completion of phased demolition, the Contractor shall inspect the condition of the remaining wall and roof of the property and shall provide all patching, repairs, enclosures, waterproofing, flashing, etc., as required to provide a weathertight enclosure until which time the permanent envelope systems are constructed.
- H. The Architect's Scope of Services and responsibilities exclude the investigation, discovery, detection, identification, presence, leakage, release, use, handling, disposal, encapsulation, abatement, treatment or removal of, or exposure of a person or persons to, hazardous materials, pollutants, contaminants, or disease transmitting organisms, preexisting or otherwise deposited at any time and in any form at the Project, including but not limited to volatile organic compounds, molds, fungus, bacteria, petroleum products, lead, asbestos or asbestos products, radon and electro-magnetic frequency radiation or other radiation. Should any such substances be encountered, the Owner and Architect shall be promptly notified, in writing.
- I. Perform demolition in a manner that maximizes salvage and recycling of materials.
 - 1. Comply with requirements of Section 01 74 19 - Waste Management.
 - 2. Dismantle existing construction and separate materials.
 - 3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.03 EXISTING UTILITIES

- A. The termination, demolition, and removal of utilities shall comply with the procedures, regulations, and recommendations of related utilities and governing authorities. The Contractor shall contact such agencies prior to proceeding, in order to assess their requirements and ensure proper coordination and full compliance.
- B. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- C. Where existing active utilities 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. All disruptions of service shall be limited and approved by the Owner prior to.
- D. Protect existing utilities to remain from damage.
- E. Do not disrupt public utilities without permit from authority having jurisdiction.
- F. 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.
- G. 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.
- H. 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.
- I. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

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 shown.
 - 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, Telecommunications, and data systems): 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 ; 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. Contractor shall leave the site in neat, clean and safe condition, with all appropriate barricades, fencing, warning signage, etc. securely in place, 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 RELATED DOCUMENTS

- A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

- A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:
 - 1. The extent of cast-in-place concrete work is shown on drawings and includes (but not by way of limitation) formwork, reinforcing, cast-in-place concrete, accessories, finishing, and casting in of items specified under other Sections of the Specifications or furnished by Owner that are required to be built-in with the concrete.
 - 2. Equipment support pads indicated on mechanical drawings to be installed by the Building Contractor.
 - 3. Cast-in-place retaining walls, exterior slabs on grade and other concrete shown on site drawings.

1.03 RELATED WORK:

- A. Metal Fabrications: Section 05 12 00
 - 1. Expansion Anchors - Section 05 12 00
 - 2. Embedded Items - Section 05 12 00
- B. Anchor Bolts: Section 05 12 00
- C. Joint Sealants: Section 07 90 00
- D. Underslab Vapor Retarders/Wall Waterproofing: Division 7

1.04 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:
 - 1. ACI "Manual of Concrete Practice".
 - 2. ACI 117 "Standard Specifications for Tolerances for Concrete Construction and Materials".
 - 3. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete."
 - 4. ACI 212.3R "Chemical Admixtures for Concrete."
 - 5. ACI 301 "Specifications for Structural Concrete for Buildings."
 - 6. ACI 302.1R "Guide for Concrete Floor and Slab Construction."
 - 7. ACI 304R "Guide for Measuring, Mixing, Transporting and Placing Concrete."
 - 8. ACI 304.2R "Placing Concrete by Pumping Methods."

9. ACI 306 R "Cold Weather Concreting."
 10. ACI 308 "Standard Practice for Curing Concrete."
 11. ACI 309R "Guide for Consolidation of Concrete."
 12. ACI 315 "ACI Detailing Manual."
 13. ACI 318 "Building Code Requirements for Reinforced Concrete."
 14. ACI 347R "Guide to Formwork for Concrete."
 15. Concrete Reinforcing Steel Institute, "Placing Reinforcing Bars."
 16. AISC "Code of Standard Practice for Steel Buildings and Bridges."
 17. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.05 SUBMITTALS:

- A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Division 1.
- B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.
- C. All submittals shall be reviewed and returned to the Architect within 10 working days.
- D. Incomplete submittals will not be reviewed.
- E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with.
- F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.
- G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.
- H. Electronic Submittals:
 1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.
 2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.
 3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.

4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.
- I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 1. Reinforcement certified mill reports covering chemical and physical properties and yield strength.
 2. Patching products.
 3. Non-shrink grout.
 4. Curing compounds, where applicable.
 5. Admixtures.
 6. Expansion/Adhesive Anchors.
- J. Shop Drawings:
 1. Shop Drawing Preparation: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings is prohibited. Shop drawings created from reproduced Construction Documents will be returned without review. Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315, showing bar schedules, stirrup and tie spacing, diagrams of bent bars, and arrangement of concrete reinforcement. Include special reinforcement required at openings through concrete elements. Include supplemental reinforcing and bar supports necessary to support reinforcing steel at proper location within forms or slabs.
 - a. Review of the shop drawings will be made for the size and arrangement of reinforcement. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.
 - b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided all items listed prior. **Incomplete submittals will not be reviewed.**
- K. Mix designs: Submit all laboratory test reports and materials for each mix design listed within. Prepare mixes by the field experience method and/or trial mixtures per the requirements of chapter 5 of ACI 318. Include the calculation of average strength and standard deviation. Proportioning by water cement ratio method will not be permitted.
- L. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.
- M. Curing Methods: Submit documentation of curing methods to be used for review. Account for anticipated project temperature ranges and conditions in curing methods.
- N. Contraction/Construction Joints: Submit plan indicating proposed location of contraction and construction joints in walls and slabs.

- O. Test Reports: Test reports shall be submitted to the Owner, Architect and Engineer within 48 hour after completion of each test.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
 - 1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide lumber dressed on at least 2 edges and one side for tight fit.
- C. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use plastic, wire bar type supports or concrete block supports complying with CRSI recommendations, unless otherwise specified. Wood, clay brick and other unspecified devices are not acceptable.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2).

2.03 CONCRETE MATERIALS

- A. Single-Source Supplier: Ready-mix concrete shall be from one supplier unless specific written approval is received from the Structural Engineer.
- B. Portland Cement: ASTM C 150, Type I or Type II, unless otherwise approved Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- C. Normal Weight Aggregates: ASTM C 33. Provide from a single source for exposed concrete. Do not use aggregates containing soluble salts or other substances such as iron sulfides, pyrite, marcasite, or ochre which can cause stains on exposed concrete surfaces.
- D. Light Weight Aggregates: ASTM C 330.
- E. Water: Potable.
- F. Air-Entraining Admixture: ASTM C 260.
- G. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F or Type G containing not more than 1% chloride ions.
- H. Fiber reinforcement shall be Type III Synthetic Virgin Homopolymer Polypropylene Fibers conforming to ASTM C1116. Fiber reinforcing shall be added and distributed prior to incorporation of Super Plasticizer.

- I. Normal range water reducing admixture: ASTM C 494 Type A containing no calcium chloride.
- J. Accelerating Admixture: ASTM C 494, Type C or E.
- K. Blast Furnace Slag: ASTM C989
- L. Fly Ash: ASTM C618, Class C or F
- M. Calcium Chloride is not permitted.

2.04 RELATED MATERIALS

- A. Underslab Vapor Retarder: Provide vapor retarder over prepared sub base. Refer to architectural drawings, geotechnical report and/or division 7 specifications for additional requirements and vapor retarder location.
- B. Non-Shrink Cement-based Grout: Provide grout consisting of pre-measured, prepackaged materials supplied by the manufacturer requiring only the addition of water. Manufacturer's instructions must be printed on the outside of each bag.
 - 1. Non-shrink: No shrinkage (0.0%) and a maximum 4.0% expansion when tested in accordance with ASTM C-827. No shrinkage (0.0%) and a maximum of 0.3% expansion in the hardened state when tested in accordance with CRD-C-621.
 - 2. Compressive strength: A minimum 28 day compressive strength of 5000 psi when tested in accordance with ASTM C-109.
 - 3. Setting time: A minimum initial set time of 60 minutes when tested in accordance with ASTM C-191.
 - 4. Composition: Shall not contain metallic particles or expansive cement.
- C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.
- D. Moisture-Retaining Cover: One of the following, complying with ANSI/ASTM C 171.
 - 1. Waterproof paper.
 - 2. Polyethylene film.
 - 3. Polyethylene-coated burlap.
- E. Liquid Membrane-Forming Curing Compound: Liquid type membrane forming curing compound complying with ASTM C 309, Type I, Class A unless other type acceptable to Architect. Curing compound shall not impair bonding of any material, including floor finishes, to be applied directly to the concrete. Demonstrate the non-impairment prior to use.
- F. Preformed Expansion Joint Formers:
 - 1. Bituminous Fiber Type, ASTM D 1751.
 - 2. Felt Void, Poly-Styrene Cap with removable top as manufactured by SUPERIOR.
- G. Slab Joint Filler: Multi-component polyurethane sealant (self-leveling type).
- H. Waterstops shall be Bentonite/Butyl Rubberbased product. Use in conjunction with manufacturer's approved mastic. Acceptable products include:
 - 1. "Waterstop Rx," by American Colloid Co.
 - 2. "Adeka Ultra Seal MC-2010," by Asahi Denka Kogyo, Kik MN.

2.05 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 318. Use material, including all admixtures, proposed for use on the project. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.
- B. Submit written reports to Architect of each proposed mix for each class of concrete. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Proportion design mixes to provide concrete with the following properties:
 - 1. Footings and foundation walls:
 - a. Strength: 3,500 psi at 28 days.
 - b. Aggregate: 3/4"
 - c. W/C Ratio: 0.55 maximum
 - d. Entrained Air: 6% +/- 1.5%
 - e. Slump: 4" maximum
 - 2. Interior Slabs on grade:
 - a. Strength: 3,000 psi at 28 days
 - b. Aggregate: 3/4" minimum, 1 1/2" maximum.
 - c. W/C Ratio: 0.54 maximum
 - d. Entrapped Air only (no entrainment), 2.5% +/- 1%
 - e. Slump: 4" maximum
 - 3. Exterior Slabs and all other exposed Site Concrete not specified elsewhere:
 - a. Strength: 5,000 psi at 28 days
 - b. Aggregate: 3/4"
 - c. W/C Ratio: 0.40 maximum
 - d. Entrained Air: 6% +/- 1.5%
 - e. Slump: 4" maximum
 - 4. Add air entraining admixture at manufacturers prescribed rate to result in concrete at point of placement having the above noted air contents.
 - 5. Additional slump may be achieved by the addition of a mid-range or high-range water reducing admixture. Maximum slump after the addition of admixture shall be 6 or 8 inches for mid-range or high range water reducing admixtures, respectively.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor, when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Structural Engineer before using in work.
 - 1. Water may be added at the project only if the maximum specified slump and design mix maximum water/cement ratio is not exceeded.
 - 2. Additional dosages of superplasticizer should be used when delays occur and required slump has not been maintained. A maximum of two additional dosages will be permitted per ACI 212.3R recommendations.

2.06 CONCRETE MIXING

- A. Job-Site Mixing will not be permitted.

- B. Ready-Mix Concrete: Must comply with the requirements of ASTM C 94, and as herein specified. Provide batch ticket for each batch discharged and used in work, indicating project name, mix type, mix time and quantity.
 - 1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required by Structural Engineer.
 - 2. When the air temperature is between 85 degrees F. and 90 degrees F., reduce the mixing and delivery time from 1 1/2 hours to 75 minutes, and when the air temperature is above 90 degrees F., reduce the mixing and delivery time to 60 minutes.

PART 3 EXECUTION

3.01 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Design, construct, erect, maintain, and remove forms for cast-in-place concrete work in compliance with ACI 347.
- C. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.
- D. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent leakage of cement paste.
- E. Vertical dovetail slots may be required for masonry tie installation. Coordinate dovetail slot spacing and location with division 4 specifications and Architectural drawings.
- F. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, dovetail slots, reglets, recesses, and the like to prevent swelling and for easy removal.
- G. Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- H. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- I. Form Ties: Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
 - 1. Unless otherwise indicated, provide ties for concrete surfaces to be exposed to view in the final condition so portion remaining within concrete after removal is 1" (minimum) inside concrete.
 - 2. Form ties shall not leave holes larger than 1" diameter in concrete surface. Repair holes left by form ties after removal of formwork.

- J. Provision for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
- K. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
 - 1. Subgrade tolerance shall conform to a tolerance of $+0/-1\ 1/2"$. Base tolerance (fine grading) for slabs shall conform to a tolerance of $+0"/-3/4"$ in. Confirm compliance of above tolerances with surveyed measurements taken at 20 ft. intervals in each direction.
 - 2. Concrete reinforcing and/or welded wire fabric shown on structural drawings is provided for structural purposes only; additional reinforcement may be necessary for reinforcing support, the anchorage of structural embedded items, and the anchorage of non-structural embedded items including but not by limitation radiant tubing. This reinforcing is not shown on the structural drawings as it is part of the contractor's means and methods and shall be included at no cost to the Owner.
 - 3. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
 - 4. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.
 - 5. Place reinforcement to obtain specified coverage for concrete protection within tolerances of ACI-318. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

3.03 JOINTS:

- A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect. Submit plan indicating proposed location of construction joints for review prior to beginning work.
 - 1. Provide keyways at least $1-1/2"$ deep in construction joints in walls, and slabs; bulkheads reviewed by the Engineer, designed for this purpose may be used for slabs.
 - 2. Roughened surfaces shall be used between walls and footings unless shown otherwise on the drawings. The footing surface shall be roughened to at least an amplitude of $1/4"$ for the width of the wall before placing the wall concrete.
 - 3. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.
 - 4. Joints in slabs on grade shall be located and detailed as indicated on the drawings. If saw-cut joints are required, the early-entry dry-cut process shall be used. Refer to ACI 302, section 8.3.12.

3.04 INSTALLATION OF EMBEDDED ITEMS:

- A. General: Set, securely anchor and build into work prior to concrete placement all anchorage devices and all other embedded items, including but not by limitation reinforcement, reinforcing dowels, embedded plates, anchor rods, anchor inserts, sleeves, load transfer plates, diamond dowels and shelf bulk heads required for other work that is attached to, bear upon, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto. Notify other trades to permit installation of their work. Templates to be utilized for setting of anchorage devices shall be constructed in a manner to allow mechanical consolidation of concrete without disturbance. Embedments shall be placed in a timely fashion to permit the inspection of embedments prior to concrete placement. **“Wet Setting” of embedded items into plastic concrete is strictly prohibited.**
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface.
- C. Provide PVC sleeves where pipes and/or conduit pass through exterior concrete or slabs. Sleeves or penetrations shall not be placed through footings, piers, pedestals, drop caps, columns or pilasters unless specifically noted.
- D. Tolerances: Tolerances for Anchor Bolts/Rods, other embedded items and bearing surfaces shall meet the requirement set forth in the latest edition of the American Institute of Steel Construction “Code of Standard Practice for Steel Buildings and Bridges,” and ACI 117. The more stringent criteria from these documents shall apply.

3.05 INSTALLATION OF GROUT

- A. Place grout for base plates in accordance with manufacturer's recommendations.
- B. Grout below setting plates as soon as practicable to facilitate erection of steel and prior to removal of temporary bracing and guys. If leveling bolts or shims are used for erection grout shall be installed prior to addition of any column load.
- C. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow to cure. For proprietary grout materials, comply with manufacturer's instructions.

3.06 PREPARATION OF FORM SURFACES:

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating material manufacturer's directions. Do not allow excess form coating to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.07 CONCRETE PLACEMENT:

- A. Preplacement Review: Footing bottoms are subject to review by the Geotechnical Engineer. Reinforcement and all concrete preparation work shall be subject to review by the Structural Engineer. Verify that reinforcing, ducts, anchors, seats, plates and other items cast into concrete are placed and securely held. Notify Engineer/Project Special Inspector 48 hours prior to scheduled placement and obtain approval or waiver of review prior to placement. Be sure that all debris and foreign matter is removed from forms.
- B. Concrete shall be placed in the presence of an approved testing agency.
- C. General: Comply with ACI 304, and as herein specified.
 - 1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.

2. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients and in a manner which will assure that the required quality of the concrete is maintained.
 3. Conveying equipment shall be approved and shall be of a size and design such that detectable setting of concrete shall not occur before adjacent concrete is placed. Conveying equipment shall be cleaned at the end of each operation or work day. Conveying equipment and operations shall conform to the following additional requirements:
 - a. Belt conveyors shall be horizontal or at a slope which will not cause excessive segregation or loss of ingredients. Concrete shall be protected against undue drying or rise in temperature. An arrangement shall be used at the discharge end to prevent apparent segregation. Mortar shall not be allowed to adhere to the return length of the belt. Long runs shall be discharged into a hopper or through a baffle.
 - b. Chutes shall be metal or metal-lined and shall have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal. Chutes more than 20 feet long, and chutes not meeting the slope requirements may be used provided they discharge into a hopper before distribution.
 - c. Pumping or pneumatic conveying equipment shall be of suitable kind with adequate pumping capacity. Pneumatic placement shall be controlled so that segregation is not apparent in the discharged concrete.
 - d. Concrete shall not be conveyed through pipe made of aluminum alloy. Standby equipment shall be provided on the site.
 - e. Tined rakes are prohibited as a means of conveying fiber reinforced concrete.
 4. Do not use reinforcement as bases for runways for concrete conveying equipment or other construction loads.
- D. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
1. Consolidate placed concrete by mechanical vibrating equipment. Hand-spading, rodding or tamping as the sole means for the consolidation of concrete will only be permitted with special permission from the Engineer. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
 2. Use vibrators designed to operate with vibratory equipment submerged in concrete, maintaining a speed of not less than 8000 impulses per minute and of sufficient amplitude to consolidate the concrete effectively. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine, generally at points 18 inches maximum apart. Place vibrators to rapidly penetrate placed layer and at least 6 inches into the preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion maintain the duration of vibration for the time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix, generally from 5 to 15 seconds. A spare vibrator shall be kept on the job site during all concrete placing operation.
- E. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

1. Consolidate concrete using internal vibrators during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 2. Bring slab surfaces to correct level with straightedge and strike off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. Do not sprinkle water on plastic surface.
 3. Maintain reinforcing in proper position during concrete placement operations.
 4. Slab thicknesses indicated on the drawings are minimums. Provide sufficient concrete to account for structure deflection, subgrade fluctuations, and to obtain the specified slab elevation at the flatness and levelness indicated here within.
 5. Finish: See “Monolithic Slab Finishes” in this specification for slab finish requirements.
- F. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
1. When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27degrees C) at point of placement.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators.
 4. All temporary heat, form insulation, insulated blankets, coverings, hay or other equipment and materials necessary to protect the concrete work from physical damage caused by frost , freezing action, or low temperature shall be provided prior to start of placing operations.
 5. When the air temperature has fallen to or is expected to fall below 40 degrees F, provide adequate means to maintain the temperature in the area where concrete is being placed between 50 and 70 degrees F.
- G. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing water.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that the steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
 3. Wet forms thoroughly before placing concrete.
 4. Do not use retarding admixtures without the written acceptance by the Architect.

3.08 FINISH OF FORMED SURFACES:

- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This concrete surface shall have texture imparted by form facing material, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 in. in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This as-cast concrete surface shall be obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Grout Cleaned Finish: Provide grout cleaned finish to scheduled concrete surfaces which have received smooth form finish treatment. Combine one part Portland cement to 1-1/2 parts fine sand by volume and mix with water to consistency of thick paint. Proprietary additives may be used at Contractor's option. Blend standard Portland cement and white Portland cement, amounts determined by trial patches, so that final color of dry grout will closely match adjacent surfaces.
 - 1. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep damp by fog spray for at least 36 hours after rubbing.
- D. Related Unformed Surfaces: At tops of walls and grade beams, horizontal offset surfaces occurring adjacent to formed surfaces, strike-off, smooth and finish with a texture matching adjacent unformed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.09 FLOOR FLATNESS AND LEVELNESS

- A. Floor flatness/levelness tolerances: Tolerances for various floor uses shall conform to the requirements set forth in ACI 117 and ACI 302 for "flat" floor profile.
 - 1. Minimum Test Area Flatness/Levelness: F_F35/F_L25
 - 2. Minimum Local F Number: F_F25/F_L15
- B. Levelness criteria shall be applied to slabs-on-grade only.
- C. Contractor shall measure floor finish within 72 hours after slab finishing and provide corrective measures for finishes not within tolerance. Corrective procedures shall be reviewed by the Architect prior to implementation.

3.10 MONOLITHIC SLAB FINISHES:

- A. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds, and as otherwise indicated.
 - 1. After placing slabs, plane surface to a tolerance not exceeding 1/2 in. in 10 ft. when tested with a 10-ft. straightedge. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms or rakes.
- B. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, and as otherwise indicated.
- C. Trowel Finish: Apply trowel finish to monolithic slab surfaces indicated, including slab surfaces to be covered with carpet, resilient flooring, paint or other thin-film finish coating system.
- D. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.

- E. Slab finishes for floor coverings not indicated or exposed to view in the final condition shall be coordinated with the Architect prior to slab placement.
- F. Slab Joints: Where indicated, sawn slab contraction joints shall be “soft cut”, immediately after concrete surface is firm enough not to be torn or damaged by the blade.

3.11 CONCRETE CURING AND PROTECTION:

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 308 as herein specified.
- B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by curing compound, and by combinations thereof, as herein specified unless noted otherwise. Curing shall commence as soon as concrete surfaces are sufficiently hard as to withstand surface damage.
- C. Curing of Slabs-on Grade:
 - 1. Slabs-on-grade shall be cured by wet curing methods unless otherwise noted.
 - 2. Slabs-on-grade to receive floor coverings with moisture sensitive adhesives shall be cured by means of a moisture retaining covering. Coordinate curing with flooring adhesive manufacturer and flooring installer. Submit curing methods to Architect for review and approval.
 - 3. Slab-on Grade with Barrier 1 Admixture shall be cured by means of a moisture retaining covering in accordance with recommendations of Barrier 1 Admixture Manufacturer.
- D. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- E. Protection From Mechanical Injury: During the curing period and duration of construction, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

3.12 REMOVAL OF FORMS:

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as joints, slabs and other structural elements, may not be removed in fewer than 14 days or until concrete has attained design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and support.

3.13 REUSE OF FORMS:

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and latency, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.14 MISCELLANEOUS CONCRETE ITEMS:

- A. Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

3.15 CONCRETE SURFACE REPAIRS:

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to the Architect.
 - 1. Cut out honeycomb, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush coat the area to be patched with approved bonding agent. Place patching mortar after bonding compound has dried.
 - 2. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, form tie holes, cracks, spalls, air bubbles, honeycomb, rock pockets, fins, and other projections on surface and stains and other discolorations that cannot be removed by cleaning.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION:

- A. Testing Agency/Project Special Inspector shall verify reinforcement, including foundation reinforcement and slab reinforcement. Agent shall verify reinforcement has been chair/placed with proper clearances.
- B. The Owner shall employ a Testing Laboratory to inspect, sample and test the materials and the production of concrete and to submit test reports. Concrete testing shall be performed by technicians certified by the Maine Concrete Technician Certification Board and/or ACI Concrete Field Testing Technician Grade I.
- C. Concrete shall be sampled and tested for quality control during placement. Quality control testing shall include the following, unless otherwise directed by the Architect.
- D. See Submittals section for report requirements.
- E. Sampling Fresh Concrete: ASTM C 172.
 - 1. Slump: ASTM C143; one test for each set of compressive strength test specimens. Sample shall be taken from middle third of the load per ASTM C172. A slump test must be run prior to the incorporation of the CFP fibers per recommendations of ACI 544. A slump test must be run prior to and following the addition of a water reducer (superplasticizer) per recommendations of ACI 301.
 - 2. Air Content: ASTM C231 "Pressure method for normal weight concrete." One test for each set of compressive strength specimens measured at point of discharge.

3. Concrete Temperature: Per ASTM C-1064; One test each time a set of compression test specimens are made.
 4. Compression Test Specimen: ASTM C31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 - a. An insulated Cure Box for specimen curing shall be supplied by Testing Agency for initial curing as defined in ACI C31.
 - b. Means of heating or cooling the Cure Box shall be provided by the Inspection Agency if required in order to maintain a temperature between 60 and 80 degrees F. Contractor shall provide an electrical source to the Testing Agency when required for temperature control.
 - c. A maximum-minimum thermometer shall be provided in the Cure Box by the Testing Agency to record the temperature range of the Cure Box during specimen curing. The Testing Agency shall record the maximum/minimum temperature of the Cure Box when transferring the specimens to the laboratory.
 - d. Test Specimens shall be moist cured.
 - e. Refer to ASTM C31 for additional requirements for Test Specimens.
 5. Compressive Strength Tests: ASTM C39; one set for each 50 cu. yds. or fraction thereof, of each concrete class placed in any one day or for each 4,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 3 specimens tested at 28 days, 1 specimen retained in reserve for later testing if required.
 6. Pumped concrete shall be tested at point of discharge per ACI 301.
- F. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by the Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods, as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION

SECTION 03 54 00
CAST UNDERLAYMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Liquid-applied self-leveling floor underlayment.

1.02 REFERENCE STANDARDS

- A. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or (50-mm) Cube Specimens) ; 2012.
- B. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars; 2014.
- C. ASTM C1708 - Standard Test Methods for Self-Leveling Mortars Containing Hydraulic Cements.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's data sheets documenting physical characteristics and product limitations of underlayment materials. Include information on surface preparation, environmental limitations, and installation instructions.
- C. Samples: Submit a range of 8" x 8" min size samples demonstrating variation of surface finish color and polish for selection.

1.04 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years of experience and approved by the manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep dry and protect from direct sun exposure, freezing, and ambient temperature greater than 105 degrees F.

1.06 FIELD CONDITIONS

- A. Do not install underlayment until floor penetrations and peripheral work are complete.
- B. Maintain minimum ambient temperatures of 50 degrees F 24 hours before, during and 72 hours after installation of underlayment.
- C. During the curing process, ventilate spaces to remove excess moisture.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cementitious Underlayment: Blended cement mix, that when mixed with water in accordance with manufacturer's directions will produce self-leveling underlayment.
 - 1. Compressive Strength, ASTM C1708, C109: Minimum 4000 psi after 28 days.
 - 2. Flexural Strength, ASTM C1708, C348: Minimum 900 psi after 28 days.
 - 3. Tensile Bond Strength, ASTM C1583: 300 PSI
 - 4. Density: 125 lb/cu ft, nominal.
 - 5. Final Set Time: 1-1/2 to 3 hours, maximum.
 - 6. Thickness: Capable of thicknesses from feather edge to maximum 3-1/2 inch.
 - 7. Surface Burning Characteristics, ASTM E84: Flame Spread Index 0, Smoke Developed Index 0.

8. Products:
 - a. Ardex K15 by Ardex Engineered Cements.
 - b. Koster SL Premium Self-Leveling Underlayment by Koster.
 - c. Laticrete Supercap by Laticrete LLC.
 - d. Standard SLU by Chapco, a division of H.B. Fuller.
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Aggregate: Dry, well graded, washed silica aggregate, approximately 1/8 inch in size and acceptable to underlayment manufacturer.
- C. Water: Potable and not detrimental to underlayment mix materials.
- D. Primer: Manufacturer's recommended type.
- E. Joint and Crack Filler: Latex based filler, as recommended by manufacturer.

2.02 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Mix to self-leveling consistency without over-watering.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that underlayment is compatible with scheduled floor covering and adhesives.
- B. Verify that substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate. Do not use acid or mastic removers on any surface. Surfaces shall be 50 degrees F, minimum and 90 degrees F maximum.

3.02 CEMENTITIOUS UNDERLAYMENT PREPARATION

- A. Remove substrate surface irregularities. Fill voids and deck joints with filler. Finish smooth.
- B. Vacuum clean surfaces.
- C. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.
- D. Close floor openings.
- E. Non-moving Crack Preparation: Thoroughly clean and chase cracks and saw-cuts. Fill with specified product.
- F. Working Cracks: Install expansion - contraction joint assemblies or fill with sealants specified for high movement joints as specified in Section 07 90 05 - Sealants.
- G. Prime substrate if recommended by the manufacturer in accordance with manufacturer's instructions. Allow to dry.

3.03 APPLICATION

- A. Install products in accordance with manufacturer's instructions.
- B. Pump or pour material onto substrate. Do not retemper or add water.
 1. Pump, move, and screed while the material is still highly flowable.
 2. Be careful not to create cold joints.
 3. Wear spiked shoes while working in the wet material to avoid leaving marks.
- C. Place to indicated floor elevation, achieving a minimum 1/8 inch thickness, with top surface level to 1/8 inch in 10 ft.
- D. If a fine, feathered edge is desired, steel trowel the edge after initial set, but before it is completely hard.

3.04 CURING

- A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.
- B. Air cure in accordance with manufacturer's instructions.

3.05 FIELD QUALITY CONTROL

- A. Field flow tests shall be performed by the Contractor periodically to ensure mix is homogeneous and free from separation.

3.06 PROTECTION

- A. Protect against direct sunlight, heat, and wind; prevent rapid drying to avoid shrinkage and cracking.
- B. Do not permit traffic over unprotected floor underlayment surfaces.

END OF SECTION

SECTION 04 20 00
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Facing Brick.
- B. Polished ground faced concrete block units, including standard and special shapes, solid units and grout filled cores as required.
- C. Mortar.
- D. Reinforcement, Ties, and Anchorage.
- E. Flashings and accessories.
- F. Building-in of lintels, bearing plates, anchors, and items supplied by other trades.
- G. Bollards: Granite.

1.02 RELATED REQUIREMENTS

- A. Section 05 50 00 - Metal Fabrications: Loose steel lintels.
- B. Section 06 10 54 - Wood Blocking and Curbing: Nailers at masonry.
- C. Section 07 21 00 - Thermal Insulation: Insulation for cavity spaces.
- D. Section 07 25 00 - Weather Barriers - Weather barrier and membrane flashings in cavity.
- E. Section 07 90 05 - Joint Sealers: Backing rod and sealant at control and expansion joints; compressible fillers at relieving angles. .

1.03 REFERENCE STANDARDS

- A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; 2011.
- B. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement; 2007.
- C. ASTM A240/A240M - Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications; 2015b.
- D. ASTM A615 - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement; 2012.
- E. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2014.
- F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2014.
- G. ASTM C91 - Standard Specification for Masonry Cement; 2012.
- H. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2011.
- I. ASTM C140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units ; 2014.
- J. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2011.
- K. ASTM C150 - Standard Specification for Portland Cement ; 2015.
- L. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).
- M. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2014.
- N. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.
- O. ASTM C476 - Standard Specification for Grout for Masonry; 2010.

- P. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2012.
- Q. ASTM C979 - Standard Specification for Pigments for Integrally Colored Concrete; 2010.
- R. ASTM C1142 - Ready-mixed Mortar for Unit Masonry.
- S. NCMA - Specification for the Design and Construction of Load Bearing Concrete Masonry.
- T. UL - Fire Resistance Directory; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene a pre-installation meeting at least 1 month before starting work of this Section; require attendance by all relevant installers.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, masonry accessories, and all other manufactured products.
- C. Shop Drawings:
 - 1. Submit shop drawings of all special masonry shapes. Shop drawings shall indicate types of materials, finishes, dimensions, and anchorage. Shapes shall be represented in plan, elevation, and related details.
 - 2. Submit shop drawing plan indicating proposed locations of all construction joints in masonry walls.
- D. Samples:
 - 1. Submit five samples of facing brick and ground faced block units to illustrate color, texture, and extremes of color range.
 - 2. Submit samples of each type of reinforcement, ties, anchors, flashing, expansion joints, joint fillers, weeps, etc.
 - 3. Sample panels: See below.
- E. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.
- F. Test Reports: Submit in dependent testing lab certificates:
 - 1. CMU with integral water repellent admixture.
 - 2. Mortar mix designs and test results including proportions and mortar ingredients.
 - 3. Masonry units compression, absorption and measurement test result

1.06 QUALITY ASSURANCE

- A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.
- B. Pre-construction Testing: If manufacturer's published test reports are not available, the Contractor shall employ and pay an approved testing laboratory to perform pre-construction testing for:
 - 1. Concrete unit masonry tests for each different unit for strength, absorption, and moisture content per ASTM C140 and fire-resistive tests per UL 618 and ACI 216.1/TMS 216.1.
 - 2. Clay Unit Masonry Tests for each different unit per ASTM C67.
 - 3. Prism tests for each type of wall construction per ASTM E447.
 - 4. Mortar testing per ASTM C780.

1.07 MOCK-UPS AND SAMPLE PANELS

- A. Mock-Up Panel(s): Construct masonry wall mock-up panel(s) sized 8 feet long by 6 feet high with an outside corner at least 2 feet long; including all components typical to the exterior wall construction, including but not limited to masonry units, mortar and accessories and flashings metal studs, sheathing, weather barrier, sealant, sample window, and insulation.

1. Mock-up panel shall be constructed in a timely manner to allow for review and modifications if necessary prior to start of any related construction
2. Contractor shall provide a concrete pad and all necessary support framing to hold mock-up panel in vertical position. Locate mock-up panel where directed by Architect
3. Mock-up panel(s) shall be of proper thickness, showing proposed masonry color range, texture, bond, mortar joint and workmanship proper installation of various wall components, relationship of mortar and sealant colors to stone colors; tooling of joints; and aesthetic qualities of workmanship. No work shall progress until the Architect has reviewed the mock-up panel(s). Panel(s) shall be revised as necessary to secure the Architect's acceptance.
4. Mock-up panel(s) shall then become the standard of comparison for all masonry work built of the same material. The panel(s) shall not be destroyed or moved until the Work is complete and accepted by the Architect.
5. Contractor shall remove mock-up panel(s) after exterior punch-list is completed.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.
 1. The maximum moisture content of concrete block when laid shall not exceed 30% for exterior exposures and 25% for interior exposures (as a percent of total absorption and is in addition to moisture level required under ASTM C90).
- B. All mortar materials shall be stored under cover in a dry place.
- C. Reinforcement steel, ties, and anchors shall be protected from the elements and, before being placed, shall be free from loose rust and other coating, including ice, that will destroy or reduce the bond.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

- A. Polished Ground-Faced Concrete Units (GFCU) Types 1 & 2: ASTM C90, normal weight, hollow block, with smooth resinous facing complying with ASTM C744, manufactured with integral water-repellant admixture. Minimum average net area compressive strength 1,900 psi.
 1. Sizes and Shapes: See Drawings.
 2. Special Shapes: Sill blocks and other shapes as indicated on the Drawings.
 - a. Sill Block: See details on Drawings.
 - b. Color: Ashland Grey GF-131 by Genest.
 3. Face Finish: Provide polished ground-faced finish one face (exposed face) and at exposed corners and ends.
 4. Colors (Basis of Design):
 - a. GFCU Type 1: Smoke GF-102 by Genest.
 - b. GFCU Type 2: Ashland Grey GF-131 by Genest.
 5. Color Blend Pattern: Provide color blend proportion in random mix unless otherwise indicated.
 - a. Type 1: 30% (percent of field)
 - b. Type 2: 70% (percent of field)
 6. Bonds: Running bond unless otherwise indicated on the Drawings.
 7. Provide solid units at all corbels, reveals lintels and where indicated on the Drawings.
 8. Basis of Design: Mirra-Tex Plus by Genest Concrete Works, Inc.
 9. Alternate Manufacturers:
 - a. Trenwyth Industries.
 - b. A. Jandris & Sons
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Units with Integral Water Repellent: Concrete block units as specified in this Section with polymeric liquid admixture added to concrete masonry units at the time of manufacture.

1. Performance of Units with Integral Water Repellent:
 - a. Water Permeance: When tested per ASTM E514 and for a minimum of 72 hours.
 - 1) No water visible on back of wall above flashing at the end of 24 hours.
 - 2) No flow of water from flashing equal to or greater than 0.032 gallons per hour at the end of 24 hours.
 - 3) No more than 25% of wall area above flashing visibly damp at end of test.
2. Use only in combination with mortar that also has integral water repellent admixture, all by a single manufacturer.
3. Applications: All CMU wet areas including: Exterior units.
4. Products:
 - a. Rheopel by BASF.
 - b. Dri-Block by W.R. Grace..
 - c. RainBloc by ACM Chemistries.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 BRICK UNITS

- A. Facing Brick: ASTM C 216, Type FBS, Grade SW.
 1. Size: manufactured to the following actual dimensions: Modular: 3-1/2 to 3-5/8 inches wide x 2-1/4 inches high x 7-1/2 to 7-5/8 inches long
 2. Special shapes: Molded and solid units as required by conditions indicated. All brick to be used to form outside corners shall be factory formed to provide return legs, as required to maintain a full running bond without clipped brick or mitered corners.
 3. Provide solid units at all corbels, reveals lintels, lip brick shapes and where indicated on the Drawings.
 4. Bonds: Running bond unless otherwise indicated on the Drawings.
 5. Efflorescence, ASTM C67: Not Effloresced.
 6. Initial Rate of Absorption, ASTM C67: Less than 20g per 30 sq. in/minute.
 7. Basis of Design: Spartan Blend Smooth by Morin Brick Company
 8. Substitutions: See Section 01 60 00 - Product Requirements.
 - a. Brick products shall be submitted for review and approval only during the bid period.
 - b. Brick meeting minimum specifications, approved per Architect sole discretion aesthetically with a minimum cost basis (material only) value of \$795 per 1,000 units.

2.03 BRICK MORTAR MATERIALS

- A. Pre-mixed Masonry Cement: ASTM C270; ASTM C 91, Type N, commercially prepared type of Portland Cement Type 1 and hydrated lime Type N.
 1. Products:
 - a. Quik-crete, Type N Portland/Lime Blend.
 - b. Blue Circle.
 - c. Eagle Bond.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 1. Colored mortar to be used at all facing brick, and polished ground faced concrete units unless otherwise indicated.
 - a. Intent:
 - 1) Facing Brick: As selected by Architect from manufacturer's full range.
 - 2) Polished Ground Faced Concrete Units: As selected by Architect from manufacturer's full range.
 - b. Color(s): Up to two (2) colors selected by Architect.
 2. Manufacturers:
 - a. Basis of Design: Davis Colors; Product True Tone Premium
 - b. Lambert Corporation
 - c. Solomon Colors
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

- C. Water: Clean and potable.
- D. Admixtures: Admixtures shall not be used without the Architect's written permission, unless specified herein.

2.04 REINFORCEMENT AND ANCHORAGE

- A. Single Strand Reinforcement: (For brick sills, soldier course and stack bond) Continuous single strand, hot dip galvanized to ASTM A153, Class B2, No. 9 gauge deformed wire.
- B. Masonry Veneer Anchors: 2-piece adjustable veneer anchor and pintel tie, stainless steel.
 - 1. Anchor Screws: Single screw veneer tie with dual diameter barrel and factory EPDM washers at both weather barrier and insulation faces. Barrel with 5/16" hex head, length to accommodate insulation.
 - a. Screw Type as recommended by manufacturer for substrate:
 - 1) Self Drilling Screw: Steel Stud
 - 2) Concrete/CMU Screw: Concrete or CMU
 - b. Barrel lengths as required for cavity applications indicated per the Drawings. Multiple lengths will be required.
 - 2. Adjustable Pintel Wire ties: Triangular shape, 3/16 inch thick minimum. Tie length shall be as required for a minimum 2" tie embedment in mortar.
 - 3. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch diameter.
 - 4. Products:
 - a. Pos-i-Tie Thermal Clip with adjustable Double Pintle Wire Tie by Heckman Building Products.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 FLASHINGS

- A. Drip Edge Flashing (for termination of membrane flashings at exterior face of masonry and to support membrane flashing across cavity voids): 0.024 inch Type 316 stainless steel continuous drip flashing, shape as indicated on the Drawings. Drip edge flashing shall extend into cavity void to support membrane thru-flashing.
 - 1. Vent Flashing provided by this Section shall be adhered to the top surface of drip flashing.
- B. Stainless Steel/Polymer Fabric Drainage Plane Flashing: ASTM A240/A240M stainless steel sheet bonded with rubber-based adhesive between one sheet of polymer fabric and one sheet of non-woven drainage material, with manufacturer's standard, self-adhering, stainless steel lap tape.
 - 1. Stainless steel: ASTM A240
 - 2. Fabrics:
 - a. Non-woven drainage fabric: Fabric laminated to front face stainless steel core.
 - 3. Mastic/sealant, outside & inside corners, end dams, splice materials, termination bars, weep vent protection, fasteners and other accessories as required for a complete system per manufacturer specifications.
 - 4. Manufacturers:
 - a. York Manufacturing, Inc ; Flash-Vent SS.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 ACCESSORIES

- A. Cavity Drainage Material: Polyester strand mat fabric to prevent mortar droppings from clogging weeps, acts as an insect barrier while promoting air flow in the cavity wall.
 - 1. Product: Weep-Armor by York Manufacturing Inc.
 - 2. Alternates:
 - a. Mortar Net USA, Ltd; Mortar Net with Insect Barrier.
 - b. Advanced Building Products Inc; Mortar Break DT.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Drip Edge: Type 304 Stainless steel; 0.032 inch thickness; compatible with membrane and adhesives.
- C. Membrane Flashing Support: Stainless steel sheet; 0.012 inch thickness; to support flexible membrane flashings across cavities and other voids in construction.
- D. Termination Bars: Stainless steel; compatible with membrane and adhesives.
- E. Weep Holes and Cavity Vents: Polypropylene honeycomb, full joint height, color as selected by the Architect.
 - 1. Products:
 - a. Dur-O-Wal; Product DA 1006 Cell Vent.
 - b. Hohmann & Barnard, Inc; Product Quadrovent.
 - c. Mortar Net USA, Ltd; Mortar Net Weep Vents.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
- G. Compressible Fillers: (Below relieving angles) See Section 07 90 05 - Joint Sealers.

2.07 CMU MORTAR MIXES

- A. Mortar for Unit Masonry: Pre-mixed masonry cement; ASTM C270; ASTM C91, commercially prepared type of Portland Cement Type 1 and hydrated lime Type S.
 - 1. Exterior masonry: Type S.
 - 2. Masonry below grade and in contact with earth: Type S., 1800 psi min.
 - 3. Products:
 - a. Quik-crete, Type S Portland/Lime Blend.
 - b. Blue Circle.
 - c. Eagle Bond.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
 - 4. Pigments for Colored Mortar: See 2.03 Brick Mortar for this Section.
- B. Water Repellant Admixture shall be added to mortar mix for use with all concrete masonry units specified with water repellent admixture.
 - 1. Use only water repellent admixture for mortar and grout from the same manufacturer as water repellent admixture in masonry units.
 - 2. Applications: All CMU wet areas including: Exterior units.
- C. Mixing: Use mechanical batch mixer and comply with referenced standards.
- D. Use of accelerating admixtures in cold weather and set-retarding admixtures during hot weather only when reviewed and approved by the Architect.

2.08 BOLLARDS

- A. Bollards: Custom cut, solid granite bollards, thermally faced with washed cap.
 - 1. Size: 12" x 12" x 84" (36" exposed above grade per Drawings)
 - 2. Stone/Color: Final selection shall be by Architect from manufacturer resources available in slab thicknesses and size specified above. Basis of Design shall assume Kitledge Grey by Fletcher Granite, Smithfield, RI or equal.
 - 3. Bollards to be inset 4'-0" below grade encased in concrete per Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other Sections are properly sized and located.
- C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.
- C. Steel sleeves shall be installed for all piping and cabling through masonry construction. Coordinate with Fire Protection, Plumbing, Mechanical and Electrical Divisions.
 - 1. Provide new sleeves for existing piping and cabling through new masonry work in renovations.

3.03 PROTECTON OF WORK

- A. During erection, all walls shall be kept dry by covering at the end of each day or shutdown period with a strong, waterproof membrane. Partially completed walls not being worked on shall be similarly protected at all times. Covering shall overhang walls at least 2' on each side, and shall be securely held in place.

3.04 COLD AND HOT WEATHER REQUIREMENTS

- A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.
- B. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- C. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

3.05 COURSING, JOINTING AND BOND PATTERN

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. All masonry work shall be properly coordinated as required to maintain aligned coursing throughout the building, unless specifically noted otherwise.
- D. Standard Concrete Masonry Units:
 - 1. Bond: Running bond unless otherwise indicated per the Drawings.
 - 2. Mortar Joints: Concave.
- E. Brick Units:
 - 1. Bond: Running bond unless otherwise indicated per the Drawings.
 - 2. Coursing: Three units and three mortar joints to equal 8 inches.
 - 3. Mortar Joints: Concave.
- F. Sealant Recesses: Outside joints around the perimeter of exterior door and window frames or other wall openings shall be not less than 1/4" nor more than 3/8" wide, and shall be cleaned out to a uniform depth of at least 3/4" ready for placement of sealant by other trades.

3.06 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.
- F. Interlock intersections and external corners .
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.07 VENT FLASHING

- A. Extend flashing 6" minimum, beyond opening, each side without stretching flashing material. Fold flashing ends at end of openings or horizontal flashing terminations to form end dam or use preformed end dams from manufacturer.
- B. Flashing width: Width required starting 1.5" to the exterior of the outside face of exterior wythe, extending through cavity, rising height required to extend above lintel steel at least 2". After inspection by the agreed upon parties the flashing should be cut flush with the leading edge of the brick
- C. Splice end joints by butting ends together over 4" wide piece of self-adhering stainless steel flashing. The self-adhering stainless steel flashing should be sealed metal face down on to the substrate with the mastic. Remove the release linear and butt the two piece of flashing together and embed them into the splice sealant. Then seal the butt seam with sealant.
- D. Surface mount flashing after certified compatible membrane barrier installation specified in Section 07 25 00 in accord with manufacturer's installation instructions
- E. Apply flashing with drainage surface to the outside.
- F. Fasten to substrate surface at top by embedding in layer of sealant and use a termination bar to fasten to the backer wall and seal the top of the termination bar with sealant.
- G. Confirm compatibility with manufacturer's mutual letters for all lapping components.
- H. Inside corners: Make in manufacturers accepted manner using corner and splice material or utilize preformed corners from manufacturer.
- I. Outside corners: Make in manufacturers accepted manner using corner and splice material or utilize preformed corners from manufacturer.
- J. Weep vent protection use the cavity drainage material and install it on the third row height of standard bricks to have the fabric reach the base of the flashing and covering the weep vents.

3.08 WEEPS/CAVITY VENTS

- A. Install weeps in veneer and cavity walls at 24 inches on center horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and where otherwise indicated per the Drawings.

3.09 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

- A. Install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Lap joint reinforcement ends minimum 6 inches.
- E. Masonry Back-Up: Embed anchors to bond veneer at maximum 16 inches on center vertically and 16 inches on center horizontally, or at a maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center and within 12 inches of openings and panel ends. Veneer ties (pintels) shall be embedded a minimum of 2" into the veneer mortar joints. All ties shall be properly sized to span the cavity.
- F. Stud Back-Up: Secure veneer anchors to stud framed back-up and embed into masonry veneer at maximum 16 inches on center vertically and 16 inches on center horizontally, or at a maximum 1.77 sq ft of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches on center.

1. Each veneer anchor shall be securely fastened into the metal studs. Proper anchorage shall be confirmed. Installation of anchor fasteners into studs shall be visually inspected at the interior face of the sheathing. Any fasteners not in the studs shall be removed and all holes made in the weather barrier and sheathing shall be sealed with a sealant recommended by the weather barrier manufacturer and compatible with all materials it is in contact with.
- G. Reinforcement shall be so placed as to assure a 5/8" minimum mortar cover on the faces of walls.
- H. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.
- I. Joint reinforcement for stack bonded soldier course masonry shall be installed continuously at all horizontal joints. Rods shall be lapped at least six (6) inches at splices. Reinforcement shall be placed as to assure 1/2" minimum mortar cover on the faces of walls.

3.11 MASONRY FLASHINGS

- A. Coordinate the installation of all flashings in masonry with Vent Flashings in this Section, to ensure that all required flashings divert water to the exterior of the building are installed.
- B. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 1. Extend flashings full width at such interruptions. Drip flashings shall extend from 1/8 inch beyond exterior face of masonry, across the cavity and turn up face of cavity wall surface at least 4 inches. Membrane flashing shall seal to weather barrier and lap over drip flashing and extend down to 1 inch into brick veneer on top of the drip flashing.
 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- C. Drip flashing shall be laid in a slurry of fresh mortar and mortar shall be placed on top of the flashing as well to maintain wall flexural strength.
- D. Lap end joints of flashings at least 4 inches and seal watertight.
- E. Flashings that cross movement joints shall be installed with a bellows effect to allow for expansion of the joint without pulling on the flashing.

3.12 LINTELS

- A. Loose steel angle lintels shall be provided for all openings in brick veneer and 4" CMU masonry as indicated in the lintel schedule or on the Structural Drawings. For miscellaneous loose steel lintels not specified on the Structural Drawings, refer to Section 05 50 00 - Metal Fabrications.
 1. All lintels at exterior openings shall be hot-dipped galvanized.
- B. Vertical cores below lintel ends shall be grouted solid full height to provide suitable bearing. Provide reinforcement at grouted cores as indicated on the Drawings.
- C. Temporarily brace lintels as required until mortar has adequately cured.
- D. Maintain minimum 8 inch bearing on each side of opening, unless otherwise indicated.

3.13 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joint in accordance with Drawing details, but not less than 3/8" for installation of sealant and backer rod specified in Section 07 90 05. Keep joint free and clear of mortar.
- D. Build in horizontal, pressure relieving joints where indicated on the Drawings. Construct joints by inserting a compressible filler of width required and installing sealant and backer rod specified in Section 07 90 05 - Joint Fillers. Locate horizontal, pressure relieving joints beneath relieving (shelf) angles supporting masonry veneer and attached to structure behind masonry veneer.

- E. CMU Control Joints: For exterior concrete masonry partitions in general as follows:
 - 1. At locations not to exceed 25' o.c., or 150% of the height of the CMU wall, or as otherwise indicated on the Drawings, whichever is less.
 - 2. Adjacent to corners and intersections of walls within a distance equal to half the general control joint spacing noted above.
 - 3. At changes in wall height or thickness.
 - 4. Above movement joints in foundations and floors.
 - 5. Below movement joints in foundations and floors.
 - 6. At one side of openings less than 6' wide and at both sides of openings more than 6' wide, located beyond opening reinforcing where applicable.
- F. Brick Veneer Control Joints: For exterior brick veneer masonry in general as follows:
 - 1. At locations not to exceed 23 feet o.c., or as otherwise indicated on the Drawings, whichever is less.
 - 2. Adjacent to corners of walls, with the sum of the distance to the corner at each wall totaling the typical joint spacing and no greater than 10' from the corner.
 - 3. At changes in wall height.
 - 4. At wall offsets.
 - 5. Below relieving angles.
 - 6. Adjacent to openings as indicated on the Drawings.

3.14 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build into masonry construction organic materials that are subject to deterioration.
- E. Bollard Installation: Anchor bollards in concrete footings. Support and brace bollards in position in concrete footings until concrete has been placed and cured.

3.15 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft, 3/8 inch in any story and 1/2 inch in 40 feet or more.
- D. Maximum Variation from Plumb at openings (windows, doors, etc): 1/8 inch in total height of opening.
- E. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in 40 feet or more.
- F. Maximum Variation from Level Coursing: 1/4 inch in any bay or 20 feet; 1/2 inch in 40 feet or more.
- G. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.
- H. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.

3.16 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, sleeves, and ductwork. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.17 FIELD QUALITY CONTROL

- A. The Owner shall employ and pay a qualified independent testing agency to perform construction testing on all locations of masonry during the first 1,000 square feet and at each additional 5,000 square feet of wall area, or as required by related codes and the Contract Documents or as directed by the Architect.
1. Mortar: Mortar composition and properties shall be tested on randomly selected mortar samples. Tests shall be conducted in accordance with ASTM C780.
 2. Additional Testing: Work which testing or inspections indicate is not in conformance with the project requirements may require re-testing. When directed by the Architect, the Contractor shall engage and pay an approved testing laboratory to perform additional testing as necessary to reconfirm nonconformance of original work and compliance of corrected work.
- B. Masonry observation and Inspection: All reinforced masonry shall be viewed daily by a Masonry Inspector who shall be an independent inspector employed by the Owner for conformance with the requirements of ACI 530.1/ASCE 6 /TMS 602 "Specifications for Masonry Structures" and NCMA TR 156.
1. The Contractor shall obtain a copy of ACI 530 and NCMA TR156 which shall be kept on site and available for use.
 2. The Masonry Inspector's daily reports shall include all items listed herein, including deficiencies and remedial actions taken. Reports shall be submitted to the Architect, Owner and the Contractor daily and to other parties weekly, unless determined otherwise. Conditions not in conformance are to be immediately reported to the Contractor and Architect.
 3. The Masonry Inspector shall have access to and be familiar with the following:
 - a. Contract documents, shop drawings, product literature, mix designs, test certificates, and other documents related to the work.
 - b. Reviewed and accepted samples of materials colors, finishes, etc.
 - c. Contractors hot or cold weather construction procedures and grouting procedures.
 - d. Construction of all sample panels.
 - e. Attend applicable pre-construction meetings.
 4. The Masonry Inspector shall, upon delivery to the site, check the following:
 - a. Concrete Masonry units: Size, shape, color, compliance with applicable standards, quality, cleanliness, and proper storage.
 - b. Mortar Materials: Compliance with applicable standards and proper storage.
 - c. Reinforcing steel and Joint Reinforcement: Size, shape, grade, finish, compliance with applicable standards, cleanliness, and proper storage.
 - d. Anchors, Connectors and Accessories: Size, type, grade, finish, compliance with applicable standards, proper storage.
 5. The Masonry Inspector shall periodically during the day examine and record work in progress for quality of workmanship and the following as applicable:
 - a. Verify proper cold or hot weather protection provisions are in place.
 - b. Observe mortar proportioning, consistency, and mixing procedures for each mortar type.
 - c. Observe masonry wall construction to verify proper bonding, mortar joint size, and tooling compliance with applicable tolerances.
 - d. Observe the preparation of samples for testing.
 - e. Check concrete masonry wall construction for vertical alignment and continuity of cells, proper bedding, clean cells for grouting, reinforcing bar placement and laps, and proper tie / anchor installation.
 - f. Check that shoring and bracing is in place and stored materials and in-place work is properly covered / protected.
 - g. Verify masonry has been installed within applicable tolerances.
 - h. Inspect connections between masonry and adjacent construction.
 - i. Verify presence of control and other movement joints and proper sealing of joints.

- j. Verify cleaning and waterproofing of masonry.
- 6. At the completion of the masonry portion of the Project, the Masonry Inspector shall submit a final report stating that all masonry work was, to the best of the Inspector's knowledge, in conformance with the Contract Documents and all applicable standards.
- C. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- D. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67 requirements, sampling 5 randomly chosen units for each 50,000 installed.
- E. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.
- F. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.18 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. All exposed brick masonry shall be thoroughly cleaned. Before applying any cleaning agent to the entire wall, it shall be applied to a sample wall area of approximately 20 sq. ft. in a location approved by the Architect. No further cleaning work may proceed until the sample area has been approved by the Architect, after which time the same cleaning materials and method shall be used on the remaining wall area. Adequate water shall be available to thoroughly pre-soak and rinse all surfaces to be cleaned.
- E. All traces of excess mortar/grout, all efflorescence and all other construction stains shall be completely removed from exposed masonry.

3.19 PROTECTION

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.
- B. Protect finishes until completion of project.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. Extent of structural steel work is shown on drawings, including schedules, notes and details to show size and location of members, typical connections, and type of steel required.
- B. Structural steel is that work defined in AISC "Code of Standard Practice" and as otherwise shown on drawings.

1.03 RELATED WORK

1. Section 05 30 00 – Metal Deck

1.04 QUALITY ASSURANCE

- A. Codes and Standards: Comply with latest provisions of the following, except as otherwise indicated:
 1. AISC "Code of Standard Practice for Steel Buildings and Bridges", Latest Edition.
 - a. Exclude the word "structural" in reference to the "Design Drawings" in section 3.1 of the Code.
 2. AISC "Specification for Structural Steel Buildings", including "Commentary" and Supplements issued thereto.
 3. AISC "*Specifications for Structural Joints using ASTM A 325 or A 490 Bolts*" approved by the Research Council on Structural Connections of the Engineering Foundation.
 4. AISC 341, "Seismic Provisions for Steel Buildings".
 5. FEMA 350, "Recommended Seismic Design Criteria for New Steel Moment-Frame Buildings".
 6. FEMA 353, "Recommended Specifications and Quality Assurance Guidelines for Steel Moment-Frame Construction for Seismic Applications".
 7. AWS D1.1 - "Structural Welding Code" - Steel.
 8. AWS D1.3 - "Structural Welding Code" - Sheet Steel.
 9. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."
 10. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."
 1. Provide certification that welders to be employed in work have satisfactorily passed AWS D1.1 qualification tests and maintained a current certification. Current certification and/or continuity log shall be submitted and be available in the field.

2. If re-certification of welders is required, retesting will be the Contractor's responsibility.
- C. Fabricator Qualifications:
1. Fabricator must be a member of the American Institute of Steel Construction (AISC), be certified for BU – Certified Building Fabricator. Fabricator shall be certified at time of bidding and for duration of project.
 2. Alternate Acceptance Criteria: If fabricator does not hold a current AISC BU certification, fabricator shall submit documentation exhibiting a minimum of 5 years' continuous experience fabricating similar scope projects. Fabricator shall submit their written procedural and quality control manuals, and evidence of periodic auditing of fabrication practices by an approved Inspection Agency. Inspection of project fabrication shall meet requirements of Chapter 17 of the International Building Code and be documented by a certified 3rd party agency at the cost of the contractor/fabricator. Documentation of fabrication inspections shall be submitted to EOR for review/record. Any services rendered by the design team to address non-compliant work shall be provided at the sole expense of the contractor/fabricator.

1.05 SUBMITTALS

- A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and Division 1.
- B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.
- C. All submittals shall be reviewed and returned to the Architect within 10 working days.
- D. INCOMPLETE SUBMITTALS WILL NOT BE REVIEWED.
- E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1 have been complied with.
- F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.
- G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.
- H. Electronic Submittals:
 1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.
 2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.
 3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
 4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and

- examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.
- I. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 1. Structural steel certified mill reports for each grade of steel covering chemical and physical properties and yield strengths.
 2. High-strength bolts (each type), including nuts and washers.
 3. Structural steel primer paint (where applicable).
 4. Structural steel top coat paint (where applicable). (Refer to Section 09 90 00.)
 5. AWS D1.1 Welder certifications.
 6. Expansion/Adhesive Anchors (coordinate with section 03 30 00).
 - J. Fabricator's Quality Control Procedures: Fabricator shall submit their written procedural and quality control manuals, and evidence of periodic auditing of fabrication practices by an approved inspection Agency.
 - K. Fabricator's Certificate of Compliance: At completion of fabrication, fabricator shall submit a certificate of compliance stating that the work was performed in accordance with the construction documents.
 - L. Shop Drawings:
 1. Shop Drawing Review: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings and/or Erection Drawings is prohibited. Shop drawings and/or Erection drawings created from reproduced Construction Documents will be returned without review.
 - a. Review of the shop drawings will be made for the size and arrangement of the members and strength of the connections. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.
 - b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings indicating all members, braced frames, moment frames and connections. Incomplete submittals will not be reviewed.
 2. Alternate Connection Design: Connections for all beam, column, braced frame, and moment connections not tabulated in the AISC "Manual of Steel Construction" (ASD or LRFD) have been designed and detailed in the drawings. Alternate connection design shall be allowed only with prior approval of the Structural Engineer. If such approval is granted, all redesigned connections shall be designed by the fabricator's engineer, registered in the State of New Hampshire. Calculations for redesigned connections shall be signed and sealed.
 3. Test Reports: Submit copies of reports of tests conducted on shop and field bolted and welded connections. Include data on type(s) of test conducted and test results.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place, in ample time to not delay work.

- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.
- D. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Steel materials shall be stored in a manner to avoid ponding of precipitation on members. Repair or replace damaged materials or structures as directed.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Structural Steel Shapes, Plates and Bars (U.N.O): ASTM A 36 minimum, higher strength steel is acceptable.
- B. Structural Steel Hot Rolled Wide Flange Shapes: ASTM A 992 Grade 50 (ASTM A572 Grade 50 with special requirements per AISC Technical Bulletin #3, dated March 1997)
- C. Steel Tube: ASTM A 500, Grade B, $F_y = 46$ ksi.
- D. Anchor Bolts: ASTM F1554, Grade 36 weldable steel, unless noted otherwise on drawings. Anchor rods that are to be exposed to weather, located in unheated enclosures, or in contact with pressure treated lumber shall be hot dipped galvanized. All anchor bolts shall be headed or double nutted. "J" or "L" type anchor bolts are not permitted. Unless otherwise noted, specified embedment it to top face of head or nut.
- E. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts. Provide hexagonal heads and nuts for all connections.
- F. High-Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts, and hardened washers, as follows:
 - 1. Quenched and tempered medium-carbon steel bolts, nuts and washers, complying with ASTM A325 or ASTM A490. Refer to drawings for diameter.
 - 2. Direct tension indicator washers or bolts may be used at Contractor's option.
 - 3. Provide hot-dipped galvanized fasteners at relieving angles.
- G. Electrodes for Welding:
 - 1. Minimum 70 ksi electrodes. Filler material shall meet the grouping requirements per AWS D1.1 Table 3.1 for matching strength of connected materials.
 - 2. All filler metal used welding shall meet the following Charpy V-Notch (CVN) requirements.
 - a. 20 ft-lb at 0 degrees Fahrenheit unless noted otherwise.
 - b. 20 ft-lb at -20 degrees Fahrenheit and 40 ft-lb at 70 degrees Fahrenheit at all complete joint penetration (CJP) groove welds.
- H. Structural Steel Coatings shall be as specified in the Structural Steel Coatings section of this specification, and as specified in Division 9.
- I. Steel Coatings for Exterior Exposed Steel: Except where indicated to be primed and painted, Hot Dipped Galvanized per ASTM A123/A123M (latest edition). Galvanizing shall be applied in a manner to provide Class C faying surfaces for slip critical connections. See Structural Steel Coatings section for additional requirements for galvanizing and painting.
- J. Non Shrink Cement-Based Grout: See Section 03300
- K. Drilled Anchors: Expansion and adhesive by HILTI, SIMPSON or POWERS/RAWL as indicated on the drawings.
 - 1. Adhesive anchor: Hilti Hit TZ with Hilti HIT HY-200 epoxy

2.02 FABRICATION

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.

1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.
 2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.
- B. Connections: Weld or bolt shop connections, as indicated.
1. Provide field bolted connections, except where welded connections or other connections are indicated.
 2. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
- C. High-Strength Bolted Connection: Install high-strength threaded fasteners in accordance with AISC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts". Unless otherwise indicated, all bolted connections are to be tightened to the snug tight condition as defined by AISC.
- D. Welded Construction: Comply with AWS Codes for procedures, appearance and quality of welds, and methods used in correcting welding work.
- E. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.
- F. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
- G. Weld Access Holes at Moment Connections:
1. Detailing and Fabrication of welded access holes for all welded moment connections shall meet the requirements of FEMA 350, "Recommended Seismic Design Criteria for New Steel Moment-Frame Buildings". This document is available at www.fema.gov.
 2. Weld access hole fabrication details, including but not by limitation, cutting methods and smoothness shall meet the requirements of FEMA 353, "Recommended Specifications and Quality Assurance Guidelines for Steel Moment-Frame Construction for Seismic Applications". This document is available at www.fema.gov.
- H. Fabricator, Erector and General Contractor shall coordinate safety requirements for the project, in accordance with OSHA Part 1926. Provide all necessary pieces and fabrications as required to safely erect and access the structure for the duration of project construction.
- I. Camber, if any, is indicated on the drawings. Camber indicated is the required camber at time of erection. Contractor shall survey camber prior to placing metal deck.

2.03 STRUCTURAL STEEL COATINGS

- A. Coordinate coating requirements with the Architect, and with Division 9 of the specifications.
- B. To the greatest extent possible, structural steel coatings shall be shop applied.
- C. Coordinate steel markings with coating system to eliminate "bleed through" on steel permanently exposed to view.
- D. Galvanizing, priming and painting for structural steel permanently exposed to view shall meet the requirements of Section 10 of the Code of Standard Practice, "Architecturally Exposed Structural Steel".
- E. Provide venting/drainage holes in closed tubular members to be hot-dipped galvanized. Holes shall be provided in a location hidden from view in the final condition and in a manner that will not reduce the strength of the member. Hole locations shall be clearly indicated on the Shop Drawings and are subject to review by the Architect.
- F. Follow manufacturer's installation and safety instructions when applying coatings. Adhere to recoat time recommendations set forth by manufacturer.

- G. Steel which is to receive spray-on fireproofing shall not to be primed or painted, unless specified by the Architect.
- H. Coatings: All exterior steel and/or steel permanently exposed to view shall receive a coating. Unless noted otherwise, refer to Division 9 specifications for products and surface preparation requirements.
- I. All Façade supporting steel including relieving angle assemblies, angle supports, top plate, and loose lintels, including fasteners, shall be hot dipped galvanized, unless noted otherwise on the Architectural Drawings. All canopy support steel, where outside the building envelope, shall be hot dipped galvanized. Complete all shop fabrication prior to galvanizing assemblies.
- J. Unheated structural steel to be enclosed with architectural finishes, including but not by limitation, canopy members and/or roof pop-up members shall be primed with rust inhibitive mio-zinc filled primer, Tnemec Series 394 unless noted otherwise. Follow manufacturer's instructions for surface preparation and application. Substitution shall be equal to the above specified products, and shall be submitted for review.
- K. Steel Embedded in Concrete/Below Grade: Steel which is embedded in concrete, below grade/slab level, or as otherwise indicated on the drawings, shall be field painted with cold-applied asphalt emulsion complying with ASTM D 1187. Paint embedded areas only. Do not paint surfaces which are to be welded until welding is complete.
- L. Field Touch-up: Touch-up all paint and galvanizing damage, including but not by limitation, damage caused during shipping, erection, construction damage, and field welded steel. See Division 9 specifications for additional requirements.

PART 3 EXECUTION

3.01 ERECTION

- A. General: Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
- B. Erection Procedures: Comply with "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- C. Surveys: Employ a Registered Land Surveyor to verify elevations of concrete bearing surfaces, and locations of anchor bolts and similar devices, before erection work proceeds, and report discrepancies to Architect and Structural Engineer. Do not proceed with erection until corrections have been made, or until compensating adjustments to structural steel work have been approved by Structural Engineer of Record. Additional surveys required to verify out-of-alignment work and/or corrective work shall be performed at the contractor's expense.
- D. Temporary Shoring and Bracing: This is the sole responsibility of the Contractor. Provide temporary shoring and bracing members with connections of sufficient strength to support imposed loads. Remove temporary members and connections when all permanent members are in place, and all final connections are made, including the floor and roof diaphragms. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds. Comply with OSHA Standard referenced previous. Retain the services of a Specialty Structural Engineer (Not the Engineer of Record) to design specialty shoring and bracing.
- E. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.
 - 1. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
 - 2. Welding to anchor bolts for corrective measures is strictly prohibited without prior written approval from the Engineer.
- F. Setting Plates and Base Plates:

1. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations. Refer to division 3 of the project Specifications for anchor bolt installation requirements in concrete.
 2. Clean concrete bearing surfaces of bond-reducing materials. Clean bottom surface of setting and bearing plates.
 3. Set loose and attached base plates for structural members on wedges or shims until fully grouted support is provided. If shown on drawings, anchor bolt nuts under base plates are not intended for erection support of base plate or column.
 4. Pack non-shrink grout solidly between bearing surfaces and bases or leveling plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials, and allow to cure. For proprietary grout materials, comply with manufacturer's instructions.
- G. When installing expansion bolts or adhesive anchors, the contractor shall take measures to avoid drilling or cutting any existing reinforcement or damaging adjacent concrete.
1. For the façade support anchorage, the contractor shall confirm the existing concrete is sound and in good condition prior to proceeding with the work. The contractor shall scan (with ground penetrating radar or approved equal) the surface of the existing concrete to identify reinforcement location. Adjust anchorage location to avoid drilling into the concrete.
 2. Holes shall be blown clean with compressed air and/or cleaned per manufacturer's recommendations prior to the installation of anchors.
- H. Field Assembly:
1. Set structural frames accurately to lines and elevations indicated.
 2. Align, adjust, level and plumb members of complete frame in to the tolerances indicated in the AISC Code of Standard Practice and in accordance with OSHA regulations.
 3. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly.
 4. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 5. Splice members only where indicated and accepted on shop drawings.
 6. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- I. Tolerances: Erection tolerances shall meet the "Code of Standard Practice" except as noted. Cumulative tolerances of framing elements shall not exceed the available tolerances of façade support systems to ensure and provide a plumb façade face.
- J. Coat columns, base plates, and brace elements encased in concrete and/or below grade with cold-applied asphalt emulsion. Coordinate coating with concrete work.
- K. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as accepted by the Engineer of Record. Finish gas-cut sections equal to a sheared appearance when permitted.
- L. Coating Damage: Touch up shop applied paint or galvanizing whenever damaged or bare. See "Coatings" sections for additional requirements.
- M. Field Cut Beam Web Penetrations:
- N. Field cut beam web penetrations are not permitted without written approval from the Structural Engineer.

1. Gas cutting torches are not permissible for cutting beam web penetrations without written approval from the Structural Engineer.
 2. Beams with field cut beam web penetrations may require reinforcement, subject to the evaluation by the Structural Engineer.
 3. The evaluation of field cut web penetrations by the Structural Engineers for Design-Build Subcontractors, including but not by limitation, Mechanical, Electrical, Plumbing and Sprinkler Subcontractors shall be compensated by the General Contractor or Design-Build Subcontractor.
 4. The cost of executing field cut web penetrations and the associated beam reinforcement for Design-Build Subcontractors, including but not by limitation, Mechanical, Electrical, Plumbing and Sprinkler Subcontractors shall be paid for by the General Contractor or Design-Build Subcontractor.
 5. Field cut beam web penetrations may not be permitted in certain locations, subject to the evaluation by the Structural Engineer.
- O. Welders shall have current evidence of passing and maintaining the AWS D1.1 Qualifications test available in the field.
- P. Welding electrodes, welding process, minimum preheat and interpass temperatures shall be in accordance with AISC and AWS specifications. Any structural steel damaged in welding shall be replaced.
- Q. Field Welded Moment Connections:
1. Welding of Moment Connections shall meet the requirements of FEMA 353.
 2. Backing materials for top and bottom flanges for field welded moment connections shall be removed, backgouge the weld root, and apply a reinforcing fillet weld.
 3. Where top flange steel backing materials are utilized, the backing may be left in place. In this case, the backing material shall be welded with a reinforcing fillet weld.

3.02 QUALITY CONTROL

- A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.
1. Required inspection and testing services are intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.
- B. Testing: Owner shall engage an Independent Testing Agency to inspect all high-strength bolted and welded connections, to perform tests and prepare reports of their findings. All connections must pass these inspections prior to the installation of subsequent work which they support.
1. Testing agency shall conduct tests and state in each report which specific connections were examined or tested, whether the connections comply with requirements, and specifically state any deviations therefrom.
 2. Contractor shall provide access for testing agency to places where structural steel work is being fabricated, produced or erected so that required inspection and testing can be accomplished. Testing agency may inspect structural steel at plant before shipment. The Engineer, however, reserves the right, at any time before final acceptance, to reject material not complying with specified requirements.
- C. Inspection Requirements (to be performed by the Independent Testing Agency):
1. Bolted Connections: Inspect all bolted connections in accordance with procedures outlined in the AISC "Specification for Structural Joints using ASTM A325 or A490 Bolts.
 2. Snug Tight Bolted Connections:

- a. The inspector shall monitor the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is used to tighten all bolts.
 - b. If the inspector does not monitor the installation of bolts, he shall visually inspect the connection to determine that all plies of connected material have been drawn together and conduct tests on a sampling connection bolts to determine if they have been tightened to the snug tight condition. The test sample shall consist of 10% of the bolts in the connection, but not less than two bolts, selected at random. If more than 10% of the tested bolts fail the initial inspection, the engineer reserves the right to increase the number of bolts tested.
3. Slip Critical Bolted Connections:
- a. The inspector shall monitor the calibration of torquing equipment and the installation of bolts to determine that all plies of connected material have been drawn together and that the selected procedure is used to tighten all bolts.
 - b. If the inspector does not monitor the calibration or installation procedures, he shall test all bolts in the affected connection using a manual torque wrench to assure that the required pretension has been reached.
4. Field Welded Connections: inspect and test during fabrication of structural steel assemblies, and during erection of structural steel all welded connections in accordance with procedures outline in AWS D1.1. Record types and location of defects found in work. Record work required and performed to correct deficiencies.
- a. Certify welders and conduct inspections and tests as required. Submit welder certifications to Engineer of Record. Perform visual inspection of all welds. Primary and secondary welds, including fillet welds, full penetration welds, and deck puddle welds, applied in the field and/or shop, shall be visually inspected.
 - b. Welds deemed questionable by visual inspection shall receive non-destructive testing. In addition, all partial and full penetration welds, and any other welds indicated on the drawings are to receive non-destructive testing. Non-destructive testing methods include the following:
 1. Radiographic Inspection (RT): ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 2. Ultrasonic Inspection (UT): ASTM E 164.
 3. Magnetic Particle (MT) inspection procedures may be utilized at the inspectors discretion in addition to RT or UT inspection. MT procedures shall not replace RT or UT procedures without permission from the Structural Engineer.
 - c. All welds deemed unacceptable shall be repaired and retested at the Contractor's expense.
- D. Inspector shall verify that all ferrules are removed when applicable and that metal deck is free of debris prior to concrete placement.
- E. Testing and inspection reports shall be submitted to the Owner, Architect and Engineer within 48 hours of completion of each test or inspection.
- F. Nonconforming Work: Contractor shall be responsible for correcting deficiencies in structural steel work which inspections laboratory test reports have indicated to be not in compliance with requirements. Additional tests and/or surveys shall be performed, at the Contractor's expense, as may be necessary to show compliance of corrected work. Any costs associated with the Engineer's review and disposition of faulty works shall be borne by the Contractor.

END OF SECTION

SECTION 05 30 00

METAL DECKING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.
- B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. Extent of metal roof deck is shown on the drawings and includes type roof deck, and accessories.

1.03 RELATED WORK

- 1. Section 05 12 00 - Structural Steel

1.04 QUALITY STANDARDS

- A. Codes and Standards: Comply with provisions of the following codes and standards, except where more stringent requirements are indicated or specified:
 - 1. AISI "Specification for the Design of Cold Formed Steel Structural Members".
 - 2. AWS D1.1 "Structural Welding Code" - Steel
 - 3. AWS D1.3 "Structural Welding Code" - Sheet Steel
 - 4. Steel Deck Institute (SDI) "Design Manual for Floor Decks and Roof Decks".
 - 5. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).
- B. Qualification of field welding: Qualify welding process and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."

1.05 SUBMITTALS

- A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and Division 1.
- B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.
- C. All submittals shall be reviewed and returned to the Architect within 10 working days.
- D. Incomplete submittals will not be reviewed.
- E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1 have been complied with.
- F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.
- G. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer, and then the Architect. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

H. Electronic Submittals:

1. Contractor shall include in the submittal schedule an indication of submittals that are intended to be submitted electronically. Upon receipt of the submittal schedule, the Engineer reserves the right to indicate submittals that will not be accepted electronically. Paper copies of such submittals shall be furnished as referenced in this specification.
2. The Engineer reserves the right to require paper copies of submittals that are received electronically. Provide Engineer one (1) paper copies in addition to the electronic submittal. Paper copy will be retained and electronic copy will be returned. Review cycle for such submittals shall not commence until such time that the paper copies are received.
3. Electronic Submittals shall be submitted in Protected Document Format (PDF) compatible with Bluebeam version 12 or later. Electronic files shall not be broken into smaller individual files. File sizes too large to process email or within a file transfer protocol (FTP) site shall be provided on a CD.
4. The submission of submittals electronically does not relieve the contractor of their responsibility to review the submittal prior to transmission to the Engineer. Electronic Submittals shall include contractor comments, and a statement and/or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with. Electronic submittals without the Contractor's approval will be rejected and returned.
5. The Engineer assumes no responsibility for the printed reproduction of submittals reviewed electronically, transmission errors or returned electronic submittals that become corrupted or are otherwise not accessible by the Contractor's or Subcontractor's computer hardware and/or software.

- I. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certification as may be required to show compliance with these specifications.

J. Shop Drawings:

1. Shop Drawing Review: Electronic files of structural drawings **will not** be provided to the contractor for preparation of shop drawings.
 - a. Submit detailed drawings showing layout and types of deck panels, galvanizing, shop paint, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing, and all other accessories. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.
 - b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings. Incomplete submittals will not be reviewed.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to insure uninterrupted progress of work.
- B. Store materials to permit easy access for inspection and identification. Keep deck sheets off ground, using pallets, platforms, or other supports. Protect deck sheets and packaged materials from corrosion and deterioration.

- C. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Materials shall be stored in a manner to avoid ponding of precipitation on members. Repair or replace damaged materials or structures as directed.

PART 2 PRODUCTS

2.01 GENERAL

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:
 - 1. United Steel Deck
 - 2. Wheeling Corrugating Co.
 - 3. Epic Metals Corporation
 - 4. Vulcraft
- B. Materials:
 - 1. Steel for Metal Deck Units: Roof Deck Units: ASTM A1008, Grade C, D, or E, or ASTM A653, Structural Quality, grade 33 or higher.
 - 2. Miscellaneous Steel Shapes: ASTM A36 minimum.
 - 3. Sheet metal Accessories: ASTM A526, commercial quality, galvanized.
- C. Galvanizing: Conform to ASTM 924-94 with minimum coating class of G60 (Z180) as defined in ASTM A653-94.
- D. Paint: Manufacturer's baked on, rust inhibitive paint, for application to metal surfaces which have been chemically cleaned and phosphate chemical treated.
- E. Flexible closure Strips: Manufacturer standard vulcanized, closed-cell, synthetic rubber.

2.02 FABRICATION

- A. General: Form deck units in lengths to span 3 or more supports, unless otherwise noted on the drawings, with flush, telescoped or nested 2" laps at ends and interlocking or nested side laps, unless otherwise indicated. For roof deck units, provide deck configurations complying with SDI "Roof Deck Specifications," of metal thickness, depth and width as shown.
- B. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units of not less than same thickness as decking. Form to match contour of deck units and approximately 6" wide.
- C. Metal Closure Strips: Fabricate metal closure strips, cell closures, "Z" closures, column closures, pour stops, girder fillers and openings between decking and other construction, of not less than 0.045" min. (18 gage) sheet steel or as indicated on the drawings. Form to provide tight fitting closures at open ends of cells or flutes and sides of decking.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.
- B. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before permanently fastened. Deck shall be in full contact with members parallel to ribs and attached as indicated. Do not stretch or contact side lap interlocks.

- C. Place deck units in straight alignment for entire length of run of cells and with close alignment between cells at ends of abutting units.
- D. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
- E. Coordinate and cooperate with the structural steel erector in locating decking bundles to prevent overloading of structural members.
- F. Do not use decking units for storage or working platforms until permanently installed.

3.02 FASTENING

- A. Roof Deck: Each deck is to be fastened with a minimum of 5/8" diameter puddle welds spaced in a 36/7 pattern (1.5B deck) with a minimum of 2 welds per unit at each support if incomplete sheet is utilized. Where support is parallel to support, at edge of building, at brace lines, at edge of opening or deck discontinuity provide puddle welds at 6" o.c. Secure deck to each supporting member in ribs where sidelaps occur. Deck units shall bear over the ends of supports by a minimum of 1.5". Sidelaps: #10 Tek screws, 6 per span for B deck, 10 per span for N deck.
- B. Welding: Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.
- C. Uplift loading: Decking units used at the roof level shall be designed for a net uplift of 15 psf.
- D. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking.
- E. Reinforcement at openings: Provide additional metal reinforcement and closures pieces as required for strength, continuity of decking and support of other work shown.
 - 1. Deck penetrations affecting no more than (1) deck rib need not be reinforced.
 - 2. For deck penetration affecting more than (1) deck rib, but less than 10", reinforce the opening with a 0.057" thick plate spanning between unaffected ribs, unless otherwise shown on the Design Drawings or supporting a piece of mechanical equipment (see item 3).
 - 3. Reinforce deck penetrations larger than 10" with the structural frame described in the Design Drawings.
- F. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units.
- G. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12" on center with at least 1 weld in each corner. Cut opening in roof sump bottom to accommodate drain size indicated.
- H. Closure Strips: Provide metal closure strips at open uncovered ends and edges of roof decking, and in voids between decking and other construction. Weld into position to provide a complete decking installation.
- I. Touch-Up Painting:
 - 1. Painted Deck: After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
 - a. Touch up painted surfaces with same type paint used on adjacent surfaces.
 - b. In areas where shop-painted surfaces are to be exposed, apply touch-up paint to blend into adjacent surfaces.

3.03 QUALITY CONTROL

- A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.

Required inspection and testing services are intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.

- B. Testing: Owner shall engage an Independent Testing Agency to inspect all puddle welded connections, to perform tests and prepare reports of their findings. All connections must pass these inspections prior to the installation of subsequent work which they support.
- C. Deck Testing Requirements (to be performed by the Independent Testing Agency):
 - 1. Deck and accessory welding and/or attachments subject to inspection and testing. Work found to be defective will be removed and replaced at the Contractor's expense.
 - 2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests. If re-certification of welders is required, re-testing will be the Contractor's responsibility.

END OF SECTION

SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Formed steel stud exterior wall framing.
- B. Exterior wall sheathing.

1.02 RELATED REQUIREMENTS

- A. Section 01 23 00 – Alternates: Installation of bullet resistant sheathing.
- B. Section 05 12 00 - Structural Steel Framing.
- C. Section 04 20 00 - Unit Masonry: Veneer masonry supported by CFMF stud wall.
- D. Section 06 10 54 - Wood Blocking and Curbing: Wood blocking.
- E. Section 07 25 00 - Weather Barriers: Weather barrier over sheathing.
- F. Section 07 42 13 - Metal Wall Panels: Minimum CFMF requirements for load support of metal wall panel and associated subgirt systems provided under Section 07 42 13.
- G. Section 09 21 16 - Gypsum Board Assemblies: Interior metal stud partition, soffit and ceiling framing.

1.03 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2012.
- B. ANSI S200 - North American Standard for Cold-Formed Steel Framing - General Provisions.
- C. ANSI S211 - North American Standard for Cold-Formed Steel Framing-Wall Stud Design.
- D. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- E. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- F. ASTM A1003 - Standard Specification for Steel Sheet, Carbon, Metallic-Coated and Non-metallic-Coated for Cold-Formed Framing Members; 2005.
- G. 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 inch to 0.112 inch in Thickness; 2004.
- H. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a.
- I. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2004.
- J. ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2008.
- K. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).

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 and subgirt systems, utilities, insulation, weatherbarriers 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 and fasteners; describe materials and finish, product criteria, limitations.
 - 1. Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, and type and location of fasteners, and accessories or items required of related work. All shop drawings shall bear the seal of the licensed structural engineer employed by the CFMF subcontractor, licensed in State of New Hampshire.
 - 1. Indicate stud layout.
 - 2. Describe method for securing studs to tracks and for bolted framing connections.
 - 3. Provide design engineer's stamp on shop drawings.
 - 4. Provide calculations for loadings and stresses of all framing that bear the seal of the licensed structural engineer employed by the CFMF subcontractor and licensed in New Hampshire.
 - a. Submit record copy of loads and reactions provided under Section 07 42 13 for metal wall panel and associated subgirt systems with this submission. Purpose of submission is to show CFMF coordination for support of such loads has been provided.
- D. Samples: Upon request, submit samples of materials specified herein.

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 New Hampshire.
- B. Manufacturer Qualifications:
 - 1. Company specializing in manufacturing the types of products specified in this Section, and with minimum fifteen years of documented experience.
 - 2. Member in good standing of the Steel Framing Industry Association. Products shall be certified under an independent third party inspection program administered by an agency accredited by IAS to ICC-ES AC98 IAS Accreditation Criteria for Inspection Agencies.
- C. Installer Qualifications: Company specializing in performing the work of this Section with minimum five years of experience.

1.07 MOCK-UPS

- A. Provide metal stud framing for exterior wall mock-up(s) specified in Section 04 20 00 - Unit Masonry and Section 07 42 13 - Metal Wall Panels.
 - 1. Mock-up panel(s) shall demonstrate actual wall construction, detailing and workmanship.
 - 2. No work shall progress until the Architect has reviewed the mock-up panel(s). Panel(s) shall be revised as necessary to secure the Architect's acceptance and shall then become the standard of comparison for all related exterior wall work.
 - 3. Mock-up panel(s) shall not be destroyed or moved until the Work is complete and accepted by the Architect. Upon completion of construction, mock-up panel(s) shall be removed.

1.08 PRE-INSTALLATION MEETING

- A. At least two weeks prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

1.09 DELIVERY, STORAGE AND HANDLING

- A. Protect and store metal framing units from rusting and damage in accordance with AISI Code of Standard Practice. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type, and grade. Store off ground in a dry ventilated space or protect with suitable waterproof covering.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing:
 - 1. Dietrich Metal Framing.
 - 2. Marino\Ware.
 - 3. EB Metals.
 - 4. 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 Criteria: Provide completed framing system having the following characteristics:
 - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S-100 North American Specification for the Design of Cold-Formed Steel Structural Members.
 - 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 and/or as specified on the Structural Drawings.
 - a. Where requirements conflict the contractor shall adhere to the more stringent requirement.
 - 4. Live load deflection meeting the following, unless otherwise indicated:
 - a. Horizontal Deflection: Design to permit maximum deflection of 1/720 of span of framing supporting masonry veneer exterior walls.
 - b. Horizontal Deflection: Design to permit maximum deflection of 1/360 of span for exterior siding finish.
 - c. Vertical Deflection: Design framing to accommodate deflection of the structural steel framing members.
 - 5. Provide industry standard safety factors as suited to specific job conditions.
 - 6. 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.
 - 7. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 FRAMING MATERIALS

- A. Studs and Track: ASTM A1003 sheet steel, structural grade, Type H; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
 - 1. Thickness: As required to meet specified performance levels, but in no case less than 43 mils thickness.
 - 2. To the extent that component types and thicknesses are indicated in the Construction Documents, they shall be considered minimum requirements to be verified and increased (but not decreased) as determined to be necessary by the fabricator's engineer. Framing member depths indicated on the Drawings shall not be altered without the Architect's prior written authorization.
 - 3. Stud spacing shall not exceed 16 inches on center.
 - 4. Galvanized in accordance with ASTM A653 G60/Z180 coating.
 - a. Provide galvanizing in accordance with ASTM A653 G690/Z275 coating at the following locations: Locker Room F131, Locker Room F135, Locker Room F141 and Locker Room F145.
- B. Framing Connectors: Factory-made formed steel sheet, ASTM A653 SS Grade 50, with factory punched holes.

1. Material: ASTM A653 SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for thicknesses less than 10 gage (0.118 inch), and factory punched holes and slots.
2. Coating: G90/Z275 hot dipped galvanized coating.
3. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
4. 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 continuous studs bypass elevated floor slab, connect stud to slab in manner allowing vertical movement of slab without affecting studs; allow for minimum movement of 1 inch as indicated on the Drawings.
 - b. Where top of stud wall terminates below structural floor or roof, connect studs to primary structure in manner allowing vertical movement of slab without affecting studs; allow for minimum movement of 1 inch. Studs connecting to secondary structure (bar joist) allow for minimum movement of 1-5/8 inch.
 - c. Manufacturers:
 - 1) Dietrich
 - 2) Superstud
 - 3) Simpson Strong Tie
5. Channel Bridging and Bracing: U-channel; minimum 0.0538" thickness; minimum 0.5" wide flanges; depth as indicated or required.
6. Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, gusset plates, and stiffeners.

2.04 WALL SHEATHING

- A. Wall Sheathing: Glass mat faced gypsum; ASTM C1177, square long edges, 5/8 inch Type X fire-resistant.
 1. Products:
 - a. DensGlass Gold by Georgia-Pacific.
 - b. Fiberock Sheathing with Aqua-Tough by USG.
 - c. GlasRoc Sheathing Type X by Certainteed - BPB America Inc.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Plates, Gussets, Clips: Formed Sheet Steel, thickness determined for conditions encountered; finish to match framing components.
- C. Sill Gaskets: Continuous 1/4" thickness closed cell foam from continuous rolls, for use under CFMF tracks on concrete at building perimeters.
- D. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of Authorities Having Jurisdiction.

2.06 FASTENERS

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Size, type, penetration and spacing shall be in strict accordance with the CFMF contractor's engineered design requirements.
 1. Coating: Corrosion resistant, high performance polymer complying with ASTM B117; salt spray test result of no rust or other base metal corrosion after a minimum of 800 hours.
- B. Anchorage Devices: Powder actuated. Welding is NOT allowed.

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. Install sill gaskets continuously on perimeter concrete surfaces, prior to track installation.
- C. Install continuous tracks sized to match studs. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on center. Provide fasteners at corners and ends of tracks. Coordinate installation of sealant with floor and ceiling tracks.
- D. Place studs plumb, 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.
- E. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- F. Abutting Structure: Where stud system abuts structural column or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
- G. Wall Openings: Frame wall opening larger than 2 feet square with additional studs (2 minimum) at each jamb of frame as required by the engineered design. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes and space jack studs same as full-height studs of wall.
- H. Install intermediate studs above and below openings to align with wall stud spacing.
- I. Secure studs to top and bottom runner tracks by screw fastening at both flanges. Provide deflection head track directly below horizontal building framing at non-load bearing framing.
- J. Supplementary Framing: Install supplementary framing, blocking and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the walls or partitions. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations, engineering and industry standards in each case, considering weight or loading requirements resulting from item supported.
- K. Attach cross studs to studs for attachment of fixtures anchored to walls.
- L. Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- M. Touch-up damaged galvanized surfaces with primer.

3.03 WALL SHEATHING

- A. General: Inspect materials to which gypsum sheathing is to be applied. Remedy all defects prior to installation of sheathing. Provide additional studs and bracing if required to secure sheathing at outside corners.
- B. Wall Sheathing: Cut sheathing by scoring or sawing. Gypsum sheathing shall be fitted tightly to abutting sheathing. All joints shall be closed tight. Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
 - 1. Coordinate sheathing installation with requirements of the air barrier system. If gaps in sheathing exceed requirements of Section 07 25 00 - Weather Barriers, they shall be taped.
- C. Sheathing shall be held in firm contact with substrate while fasteners are being driven. Sheathing shall be fastened as determined and detailed by the engineered design. Unless

otherwise indicated, space fasteners a maximum of 8 inches o.c. around perimeter and in field at framing locations. Care shall be taken not to break sheathing face while driving fasteners.

- D. Fastening Sheathing: Gypsum board at exterior walls may be an integral part of the structural lateral stud bracing of the masonry veneer. Coordinate with the requirements of the engineered design.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements for general requirements for testing and inspections.
- B. Testing and inspection shall be performed by the Owner's Testing Agency as identified in the Statement of Special Inspections.
- C. If work is found not to conform to the Construction Documents, the Contractor shall be responsible for the cost of all further testing.

3.05 TOLERANCES

- A. Maximum Variation from True Position: 1/8 inch per 10'.
- B. Maximum Variation of any Member from Plane: 1/8 inch per 10'.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Shop fabricated miscellaneous steel and aluminum items. including but not limited to:
 - 1. Frames, brackets and supports for:
 - a. Supports for hardware, electrical equipment, and other items as indicated or required.
 - 2. Loose lintels not furnished under Section 05 12 00 - Structural Steel.
 - 3. Bollards.
- B. It shall be a requirement of the Work of the Section to thoroughly review all of the Construction Documents and provide any and all miscellaneous metal fabrications required for a complete and proper job.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 12 00 - Structural Steel.
- D. Section 09 90 00 - Painting and Coating: Compatibility of paint finish systems with primers included in this Section, where applicable.

1.03 REFERENCE STANDARDS

- A. ASTM A36 - Standard Specification for Carbon Structural Steel; 2008.
- B. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.
- C. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2012.
- D. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- E. ASTM A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2012.
- F. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2010.
- G. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2010a.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2012.
- J. ASTM B211 - Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire; 2012e1.
- K. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- L. AWS D1.1 - Structural Welding Code - Steel; American Welding Society; 2010.
- M. AWS D1.2 - Structural Welding Code - Aluminum; American Welding Society; 2008.
- N. SSPC-Paint 15 - Steel Joist Shop Primer; Society for Protective Coatings; 1999 (Ed. 2004).
- O. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); Society for Protective Coatings; 2002 (Ed. 2004).
- P. SSPC-SP; Society for Protective Coatings; 1982 (Ed. 2004).

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit for manufactured products specified herein.
- C. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - 1. Submit lintel fabrication schedule including location, type, size, length and finish (primed or galvanized coating class).
- D. Certifications:
 - 1. Submit seismic analysis certification sealed and signed by a registered professional structural engineer in the State in which the Project is located, that all equipment stands, frames, and supports comply with applicable codes.
 - 2. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.
 - 3. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.
 - 4. Submit documentation of steel fabricator's in-plant special inspections program including registration of special inspections program, written procedural and quality control manuals and evidence of periodic auditing of fabrication practices by an approved inspection agency.
- E. Samples: Submit samples representative of materials and finished products as may be requested by the Architect.

1.05 QUALITY ASSURANCE

- A. Fabricator's Qualifications: Only fabricators that maintain an agreement with an approved independent inspection or quality control agency to conduct periodic in-plant inspections at the fabricator's plant, at a frequency that will assure the fabricator's conformance to the requirements of the inspection agency's approved quality control program will be approved for this project.
- B. Design equipment supports 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.
- C. Welding Standards: Comply with applicable provisions of ASW D1.1 "Structural Welding Code - Steel" and ASW D1.3 "Structural Welding Code - Sheet Steel".

1.06 PRODUCT HANDLING

- A. Delivery of Materials: Deliver, store and handle components in such a manner as to prevent damage to finished surfaces.
- B. Storage of Materials: Store components in a dry, clean location, away from uncured masonry and concrete. Cover with tarpaulin or polyethylene sheeting.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

- A. Steel Sections: ASTM A36.
- B. Steel Tubing: ASTM A500, Grade B cold-formed structural tubing.
- C. Plates: ASTM A283.
- D. Pipe: ASTM A 53, Grade B Schedule 40, black finish.
- E. Slotted Channel Framing: ASTM A653 Grade 33, electro-galvanized steel metal channel framing and ASTM A1011 channel fittings system
 - 1. Engineered, fabricated and installed by the manufacturer's authorized installer with a minimum of five (5) years of experience.

2. Field inspection to verify job conditions, dimensions and suitability of primary structure to receive channel framing.
3. Engineering of all channel framing, attachments between framing members, attachments between framing systems and building structure, and anchor points to receive attachments by the manufacturer of the building material or equivalent to be supported by the channel framing systems.
4. Coordination of framing load capacity and anchor point types and locations with the requirements of the related material or equipment manufacturer.
5. Submission of structural calculations including, but not limited to design criteria, stress and deflection analysis and selected framing, fittings and anchors prepared by a professional structural engineer licensed in the State of New Hampshire.
6. Manufacturer: Unistrut Corp.
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
- F. Fasteners: ASTM B33, Class FE/An 25 for electro-plated zinc coating, for exterior use or where built into exterior walls. Select fasteners for the type, grade, and class required.
 1. Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, galvanized to ASTM A 153/A 153M where connecting galvanized components.
 2. Machine Screws: ANSI B18.6.3.
 3. Lag Bolts: ANSI B18.2.1.
 4. Expansion Anchors: Carbon steel components zinc-plated to comply with ASTM B633.
- H. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- I. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.
- J. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

2.02 MATERIALS - ALUMINUM

- A. Extruded Aluminum: ASTM B221, 6063 alloy, T6 temper.
- B. Sheet Aluminum: ASTM B209, 5052 alloy, H32 or H22 temper.
- C. Aluminum-Alloy Drawn Seamless Tubes: ASTM B210, 6063 alloy, T6 temper.
- D. Aluminum-Alloy Bars: ASTM B211, 6061 alloy, T6 temper.
- E. Bolts, Nuts, and Washers: Stainless steel.
- F. Welding Materials: AWS D1.2; type required for materials being welded.

2.03 FABRICATION

- A. NOTE: It is the Owner's intent to use energy conserving, environmentally friendly materials to the greatest extent practical. The Contractor is therefore encouraged to use recycled steel products.
- B. Metal fabrications shall be standard approved products, fabricated in accordance with best shop practices and, wherever possible, shop assembled, ready for erection.
- C. Metals shall be free from defects impairing strength, durability, or appearance and shall be best commercial quality for purposes specified. Metals shall be made with structural properties, to safely sustain and withstand strains, stresses, to which they will be normally subjected.
- D. Fit and shop assemble items in largest practical sections, for delivery to site.
- E. Fabricate items with joints tightly fitted and secured.
- F. Continuously seal joined members by continuous welds.
- G. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- H. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

- I. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.04 FABRICATED ITEMS

- A. Miscellaneous Framing and Supports: Provide steel framing and supports for applications indicated that are not a part of structural steel scope as required to complete the Work. Fabricate units to sizes, shapes, and profiles indicated and required to receive adjacent construction. Fabricate from steel shapes, plates, and steel bars of welded construction using mitered joints for field connections. Cut, drill, and tap units to receive hardware, hangers, and similar items. Equip units with integrally welded anchors for casting into concrete or building into masonry.
- B. Loose Steel Lintels
 1. Loose lintels shall be fabricated from A-36 steel from angles, shapes and masonry anchors of size and type scheduled for openings in masonry walls, unless otherwise indicated on the Drawings.
 2. Provide not less than eight (8") inches bearing at each side of openings, unless otherwise indicated. Under no circumstances shall bearing (each end) be less than one (1") inch per foot of span.
 3. Loose lintels, unless specifically otherwise noted, shall be installed with long legs vertical.
 4. All exterior wall lintels shall be hot-dipped galvanized after fabrication. Back-to-back lintels shall have exposed seams continuously welded and ground smooth prior to galvanizing.
 5. Lintels shall be required over all openings in masonry walls, including openings required for all other trades (i.e. mechanical and electrical equipment and ductwork, etc.), except where CMU lintels are otherwise scheduled or detailed.
 6. Loose Steel Lintel Schedule:

Max. Masonry Openings	Wall Thickness 4 Inch Walls	Wall Thickness 6 Inch Walls
2' - 0" (& under)	1L 3-1/2 x 3-1/2 x 1/4	2Ls 3-1/2 x 2-1/2 x 1/4
3' - 0"	"	"
4' - 0"	1L 4 x 3-1/2 x 1/4"	
5' - 0"	"	2Ls 3-1/2 x 2-1/2 x 5/16
6' - 0"	1L 5 x 3-1/2 x 1/4"	
	Wall Thickness 4 & 6 Inch Walls	
6' to 10'	1L 5 x 3-1/2 x 3/8	
10' to 11'	1L 7 x 4 x 3/8	
11' to 14'	1L 8 x 4 x 3/8	

2.05 FINISHES - STEEL

- A. Shop Priming:
 1. Applications: All steel items except as otherwise indicated. Do not prime surfaces in direct contact with concrete, galvanized items, where field welding is required, and items to be covered with sprayed fireproofing.
 2. Preparation:
 - a. Prepare exterior steel surfaces to be primed in accordance with SS PC-SP6 Commercial Blast Cleaning Standard.
 - b. Prepare interior steel to be primed and steel to be fireproofed in accordance with SS PC-SP3 Power Tool Cleaning Standard.
 - c. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
 3. Product: One coat shop standard primer, 2 - 3 mils DFT.
- B. Galvanizing:
 1. Applications: All exterior steel unless indicated for additional finish.

2. Galvanize steel members after fabrication to ASTM A123 requirements by a member of the American Galvanizers Association, Inc with a high grade, non-lead zinc bath.
3. Smoothness: galvanizing shall a rugosity of 4 or less (16-20 microns of variation) when measured by a profilometer over a 1 inch straight line on the surface of elements that are less than 24 pounds per running foot. Profilometer shall be capable of operating in 1 micron increments.
4. Warranty: Galvanizer's standard warranty that materials shall be free from 10% or more visible rust for 20 years.
5. Where hot-dip galvanizing prior to completion of fabrication (cutting or welding operations) cannot be avoided, joints and cuts shall be finished with four (4) full coats of touch-up galvanizing repair paint as recommended by the fabricator.

2.07 FINISHES - ALUMINUM

- A. Exterior Aluminum Surfaces: Class I natural anodized.
- B. Interior Aluminum Surfaces: Class II natural anodized.

2.08 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive work. Coordinate all work with the work of other trades.

3.02 PREPARATION

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.
- C. Shearing and punching shall leave clean true lines and surfaces. Weld or rivet permanent connections. Welds and flush rivets shall be finished flush and smooth on surfaces that will be exposed after installation. Welds shall be continuous unless otherwise noted. Welds shall not have voids or pockets and shall be ground to provide smooth transitions between metal surfaces. Do not use screws or bolts where they can be avoided; where used, heads shall be countersunk, screwed up tight and threads nicked to prevent loosening.
- D. Fastenings shall be concealed where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Joints exposed to weather shall be formed to exclude water. Provide holes and connections for the work of other trades.
- E. Connections and accessories shall be adequate to safely sustain, withstand stresses, strains, to which they will be normally subjected.
 1. Bolts, nuts, screws for exterior work shall be electrogalvanized, unless otherwise noted.
- F. Furnish all standard screws, bolts, washers, and other such fastening devices as are necessary for attaching this work to other materials. Anchors and other connecting devices required in concrete or masonry shall be built-in as the work progresses. NOTE: Special attention shall be given to the firm and secure anchoring of overhead mounted materials and equipment.
- G. Do cutting, punching, drilling, tapping required for attachment of other work coming in contact with miscellaneous metal where so indicated or where directions for same are given prior to or with review of shop drawings.

- H. Unless otherwise indicated, bolt, and screw heads shall be flat countersunk in exposed faces of ornamental or finished character; elsewhere as required. Cut off bolts, screws, etc., where exposed, flush with nuts, or other adjacent metal. Except as otherwise required, weld shop-assembled connections; welds, bolts, or machine screws may be used for field connections. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous. Exposed fastenings shall be the same materials, color, and finish as metal to which they apply, unless otherwise required.
- I. Make up threaded connections tightly so that threads will be entirely concealed by fittings.
- J. Allow for thermal movement resulting from a maximum temperature range change of 120 degrees F ambient and 180 degrees F surface by preventing buckling, opening up of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and night time sky heat loss.

3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects. All work shall be designed for adjustment to field variation, fitted with proper joints and intersections, adequately anchored in place.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Perform field welding in accordance with AWS D1.1.
- D. Obtain approval prior to site cutting or making adjustments not scheduled.
- E. Work to be built in with masonry shall be of form required for anchorage, or be provided with suitable anchors, expansion shields, toggle bolts, etc. as required for proper anchorage. Fastening to wood plugs in masonry shall not be permitted.
- F. Install all supporting members, fastening, framing, hangers, bracing, brackets, straps, bolts, angles, and the like required to set, connect work rigidly and properly to structural steel, masonry, other construction.
- G. Setting bearing plates: Clean concrete and masonry bearing surfaces of bond reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates. Set bearing and leveling plates on wedges, shims or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.
- H. Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint, and paint exposed areas with the same materials as used for shop painting, complying with SSPC-PA1. Apply by brush or spray to provide a minimum 2 mil dry film thickness. Clean field welds, bolted connections and abraded areas of galvanized surfaces to comply with ASTM A780.

3.04 TOLERANCES

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

END OF SECTION

SECTION 06 10 54
WOOD BLOCKING AND CURBING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Roof nailers, perimeter blocking and curbs.
- B. Blocking for wall and roof openings.
- C. Blocking for support of wall mounted items indicated per the Drawings.
- D. Preservative treatment of wood and isolation strips to separate preservative treated wood from metal surfaces.
- E. Unless otherwise specified per the Drawings the intent of the scope of work includes the complete demolition and replacement of roof perimeter blocking. During the course of work other existing blocking exposed shall be carefully examined by the Contractor. The Contractor shall notify the Architect upon discovery of any conditions which suggest that existing materials may be rotted, checked, warped, termite infested, improperly installed or otherwise unsuitable for continued use. Do not replace or conceal such blocking without written approval.

1.02 REFERENCES

- A. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. AWPA U1 - Use Category System: User Specification for Treated Wood; 2013.
- C. PS 1 - Structural Plywood, 2009.
- D. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology; 2010.
- E. SPIB - Grading Rules; Southern Pine Inspection Bureau, Inc.; 2002 and supplements.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials.
- C. Certifications: Submit wood preservative treated manufacturer's certifications that treated materials comply with requirements. Indicate type of preservative used, net amount of preservative retained, and chemical treatment manufacturer's written instructions for handling, storing, installing and finishing treated materials.
 - 1. Submit verification of compliant moisture content for waterborne treated products.
 - 2. Submit warranties from chemical treatment manufacturers for each type of treatment.
- D. Submit dimension lumber certificates indicating compliance with minimum allowable unit stresses. Indicate species and grade selected for each used and design values approved by the American Lumber Standards Committee Board of Review.

1.04 MOCK-UPS

- A. Mock-Ups: Provide mock-ups of exterior framed wall, including components specified elsewhere, such as stud framing, gypsum wall sheathing, weather barrier, insulation, masonry veneer, window framing, and door framing.
 - 1. Mock-up panels shall demonstrate actual wall construction, detailing and workmanship. Finish materials shall be of the proper thickness, showing proposed color range, texture, bond, joints, and workmanship.
 - 2. No work shall progress until the Architect has reviewed the sample panels. Panels shall be revised as necessary to secure the Architect's acceptance. The panels shall then become the standard of comparison for all related exterior wall work.

1.05 QUALITY ASSURANCE

- A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
 - 1. Acceptable Lumber Inspection Agencies: Any agency with rules approved by American Lumber Standards Committee. Inspection agencies shall include: NLGA, SPIB, WCLIB, WWPA. Lumber shall be piece factory-marked with agency grade stamp.
 - 2. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
- B. Plywood: Comply with PS 1.
- C. Coordination with other Trades: Coordinate the locating of blocking, nailers, and similar supports for finish materials, millwork, casework, finish carpentry, equipment, hardware and accessories, regardless of whether such items are Owner or Contractor furnished, so that the installation of finish work may be properly executed in compliance with the intended design requirements. Before starting installation of supports, carefully check all related shop drawings and submittals.

PART 2 PRODUCTS

2.01 DIMENSION LUMBER

- A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
- B. Miscellaneous Blocking, Furring, Nailers, and Curbs: Nominal sizes as indicated on the Drawings, S4S, kiln dried, S4S, No. 2 or Standard Grade.

2.02 PLYWOOD PANELS

- A. Miscellaneous Panels:
 - 1. Concealed Plywood: APA rated sheathing, PS-1, C-C Plugged or better, exterior grade, thickness as indicated.

2.03 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Fastener Coatings:
 - a. Hot-dipped galvanized steel per ASTM A153 or AISI Type 304 stainless steel for exposed to weather or high humidity locations.
 - b. AISI Type 304 stainless steel at preservative treated wood locations, as appropriate to suit job conditions.
 - c. Hot-dipped galvanized nails per ASTM A653, Class G185.
 - 2. Anchors: Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Expansion anchors shall conform to Federal Specification FF-S325.
 - a. Anchors shall be capable of sustaining without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by ASTM E488.
 - b. Materials: Carbon-steel, zinc plated, ASTM B633, Class FE/Zn5, or Stainless-steel with bolts and nuts, ASTM F593 and ASTM F594, Alloy Group 1 or 2.
 - 3. Lag Screws and Lag Bolts: Shall conform to Federal Specification FF-B-561 and ASME B18.2.1.
 - 4. Power Driven Fasteners; Shall conform to National Evaluation Report NER-272.
 - 5. Nails and Staples: Shall conform to Federal Specification FS-N-105 and ASTM F1667.
 - 6. Bolts: Conform to Federal Specifications FF-B-571 and FF-B-575, ASTM A307, Grade A and ASTM A563 for hex nuts and flat washers.
 - 7. Ground Anchorage: Wood plugs or nailing blocks are not acceptable for fastening grounds, furring, etc. to concrete or masonry. Hardened steel nails, expansion screws, toggle bolts, metal plugs, or metal inserts, as most appropriate for each type of masonry or concrete construction shall be used.

8. Thermal Spacers: Polyester reinforced nylon, ½ inch. Providing a thermal break between curtain wall assemblies and structural support angles and where otherwise indicated per the Drawings.

2.05 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. 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 Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A. Each piece shall have an affixed quality mark to include identification of inspection agency, treatment standard, treating facility, preservative, retention and suitable end use.
 1. Kiln dry after treatment to maximum moisture content of 19 percent.
 2. Provide preservative pressure treated wood products in locations consistent with manufacturer's use recommendations. Locations as follows, not exposed to weather:
 - a. Wood in contact with roofing or flashing.
 - b. Wood in contact with masonry or concrete.
 - c. Wood more than 18 inches above grade indicated to be pressure treated (PT) on the Drawings.
 3. Wood Preservatives:
 - a. CA-C - Copper Azole, Type C. (Min. 0.06 absorption).
 - b. ACQ - Alkaline Copper Quaternary. (Min. 0.25 absorption).
 - c. MCA - Micronized copper azole. (Min. 0.05 absorption).
 - d. PTI - Propiconazole-Tebuconazole-Imidacloprid. (Min. 0.018 absorption).
- C. Pressure Treatment of Lumber in Contact with Soil: AWPA U1, Treatment UC4A. Each piece shall have an affixed quality mark to include identification of inspection agency, treatment standard, treating facility, preservative, retention and suitable end use.
 1. Preservative for Field Application to Cut Surfaces: As recommended by manufacturer of factory treatment chemicals for brush-application in the field.
 2. Heartwood treated pieces shall be culled out and not used in wet or dirty locations.
 3. Kiln dry after treatment to maximum moisture content of 19 percent.
 4. Provide preservative pressure treated wood products in locations consistent with manufacturer's use recommendations. Locations as follows:
 - a. Wood exposed to weather.
 - b. Wood less than 18 inches above grade.
 5. Wood Preservatives:
 - a. CA-C - Copper Azole, Type C. (0.15 absorption)
 - b. ACQ - Alkaline Copper Quaternary. (0.40 absorption)
 - c. MCA - Micronized copper azole. (0.14 absorption)
- D. Restrictions: Do not use lumber or plywood treated with chromated copper arsenate (CCA) or creosote.
- E. Isolation Strips: Self-adhering, polymer modified asphalt sheet, 40 mil thickness, with strippable release paper.
 1. Products:
 - a. Vycor V40 Tape.
 - b. Vycor Ice & Watershield.
 - c. Perm-A-Barrier Wall Membrane by W.R. Grace.

- d. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Examine and correct any conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected. Set members level and plumb, in correct position.
- B. Place horizontal members with crown side up.
- C. Construct curb members of single pieces.
- D. Space framing and furring members 16 inches o.c.
- E. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.
- F. Coordinate curb installation with installation of decking and support of deck openings.
- G. Provide miscellaneous members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- H. Cut out and discard all defects that will render a piece unable to serve its intended function. The Architect may reject lumber whether or not it has been installed, for excessive checking, warp, twist, bow, crook, mildew, fungus or mold as well as for improper cutting and fitting.
- I. Securely attach rough carpentry work to substrate by anchoring and fastening complying with CABO NER-272 for power-driven fasteners, and fastening schedules in the International Building Code, unless otherwise indicated.
- J. All preservative treated wood shall be separated from all aluminum and steel surfaces by use of flexible membrane isolation strips.

3.02 INSTALLATION OF PLYWOOD

- A. Secure with long dimension perpendicular to framing members, with ends over firm bearing and staggered, using nails, screws, or staples.
- B. Materials shall be applied according to recommendations of the American Plywood Association.
- C. All preservative treated plywood shall be separated from all metal (coated and uncoated) by use of isolation strips.

3.03 INSTALLATION OF WOOD BLOCKING

- A. Install all wood blocking as required to provide anchorage for other materials, fixtures, accessories, etc. Blocking shall be minimum 1-1/2" thick materials.
- B. Wedge, anchor and align blocking to provide a rigid and secure installation of both blocking and other work related thereto.
- C. All wall-mounted door stops and interior signage attached to gypsum wallboard surfaces shall have blocking within the supporting wall.
- D. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated. Build anchor bolts into masonry during installation of masonry work wherever possible. Secure anchor bolts to formwork before concrete placement wherever possible.
- E. All preservative treated wood blocking shall be separated from all metal (coated and uncoated) by use of isolation strips.

3.04 INSTALLATION OF ROOF BLOCKING

- A. Roof blocking shall be installed in accordance with FM Loss Prevention Data 1-49. The following shall be considered the minimum requirements for anchoring roof blocking. Provide a minimum of two (2) anchors per length of each piece of blocking, and within six (6) inches of each end. The Contractor shall provide additional fasteners as needed to suit specific job

conditions. Perimeter roof blocking shall be secured to decking, structural steel, spaced steel angles, or plates as described below unless indicated otherwise on the Drawings:

1. Roof blocking parallel to metal decking ribs: Secure blocking to joists or beams with 3/8" diameter bolts at no more than 4'-0" oc. Where joist or beam spacing is greater than 4'-0", bolt blocking to a continuous steel angle secured to the structure at maximum spacing of 4'-0" o.c. welded to the structure. As an alternative method, blocking may be secured to the deck with two rows of #10 stainless steel screws at twenty-four (24) inches o.c. with 5/8 inch diameter stainless steel washers.
 2. Roof blocking perpendicular to metal decking ribs: Secure blocking to the deck with two rows of #10 stainless steel screws at twenty-four (24) inches o.c. with 5/8 inch diameter stainless steel washers.
 3. Roof blocking anchored to masonry: Secure blocking with 1/2 inch diameter bolts, spaced a maximum of four (4) feet o.c., staggered if the blocking is wider than six (6) inches. Within eight (8) feet of building corners, provide bolts at two (2) feet o.c. Bolts shall be embedded in grouted masonry cells a minimum depth of eight (8) inches.
 4. For nailing layers of blocking to each other, provide nails in two (2) rows, staggered with spacing not to exceed 12 inches o.c. within the row. Nails to secure blocking to other blocking shall be galvanized and shall be long enough to penetrate 1-1/4 inch minimum.
- B. Form blocking in conjunction with perimeter roof fascias, gravel stops and membrane roofs to shapes as detailed. Shim as required to continuously align flush with top of abutting roof insulation, including added thickness of tapered insulation, where applicable. Shim as required to maintain a constant top of fascia/gravel stop elevation, where applicable.
- C. All preservative treated wood blocking shall be separated from all metals (coated and uncoated) surfaces by use of isolation strips.

3.05 SITE APPLIED WOOD TREATMENT

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

END OF SECTION

SECTION 06 20 00
FINISH CARPENTRY & ARCHITECTURAL MILLWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Custom woodwork items including but not limited to:
 - 1. Solid surface window sills & trim.
- B. Hardware and attachment accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 54 - Wood Blocking and Curbing: Concealed wood blocking.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2009.
- B. ANSI A208.2 - American National Standard for Medium Density Fiberboard; 2009.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. AWI/AWMAC/WI - Architectural Woodwork Standards; 2009.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with installation of associated and adjacent components.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide manufacturer's technical information for all fabricated products, and accessories specified herein.
- C. Shop Drawings: Indicate materials, elevations, construction, clearances, component profiles, fastening methods, jointing details, finishes, hardware locations and accessories.
 - 1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot.
 - 2. Provide the information required by AWI/AWMAC/WI (AWS).
- D. Samples:
 - 1. Submit confirmation samples and color chips for selected solid surfacing.

1.06 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this Section with minimum five years of documented experience, with at least one project in the past 5 years with value of woodwork within 50 percent of cost of woodwork for this Project.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect woodwork and millwork during transit, delivery, storage and handling to prevent moisture and other damage, soiling and deterioration.
- B. Do not deliver millwork until environmental conditions are suitable (enclosed, dry, with operating HVAC system), and painting and similar operations that could damage woodwork and millwork are complete.

1.08 PROJECT CONDITIONS

- A. Field Dimensions: The woodwork fabricator shall be responsible for coordinating the dimensions of all his work with actual field conditions. The Contractor and fabricator shall cooperate to establish and maintain dimensions as required for a proper fit, without field modifications. Verify locations of concealed framing, blocking, reinforcements, and furring that support woodwork by accurate measurements before being enclosed.

1.09 FIELD CONDITIONS

- A. During and after installation of millwork, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.01 FINISH CARPENTRY & ARCHITECTUREAL MILLWORK ITEMS

- A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI Architectural Woodwork Standards for Custom Grade for plastic laminate faced items, and Premium Grade for hardwood items.
- B. Surface Burning Characteristics: Provide materials having fire and smoke properties as required by applicable code.
 - 1. In general, finishes shall be Class C except Class B minimum shall be provided in exits, lobbies and corridors.

2.02 SHEET MATERIALS

- A. Plywood is defined as a panel manufactured with 3 or more layers (plys) of wood products composed of outer veneers or overlays and core materials laminated into a single sheet or panel.
 - 1. All plywood shall be manufactured in the United States or Canada.
 - 2. Cores shall comply with published industry standards for cores manufactured for use in architectural woodwork.
 - 3. Where a core is not specified, selection shall be at the option of the AWI woodworker.
- B. Panel Core: Medium density fiberboard (MDF); ANSI A208.2, class MD or MD-EXT as applicable, no urea formaldehyde-added, composed of wood chips, sawdust, or flakes of 47 pcf minimum density, made with water resistant adhesive; of grade to suit application; sanded faces.
 - 1. Applications: For moisture resistant type at window sills, and where otherwise indicated.
 - 2. Modulus of Elasticity: 405,000 psi minimum.
 - 3. Screw Holding Face: 250 lbs minimum.
 - 4. Screw Holding Edge: 225 lbs minimum.

2.03 SOLID SURFACING

- A. Solid Surfacing: Homogenous filled acrylic, meeting ANSI Z124.3 and Z124.6, Type VI.
 - 1. Thickness: 1/2 inch.
 - 2. Joint Adhesive: Manufacturer's standard two-part adhesive to create inconspicuous, non-porous joints, with a chemical bond.
 - 3. Panel Adhesive: Manufacturer's recommended silicone.
 - 4. Support Substrate: Type as specified per this Section; 3/4 inch thickness or as indicated.
 - 5. Manufacturers and Colors: See Finish Drawings.

2.04 FASTENINGS AND ACCESSORIES

- A. Adhesives: Suitable for the purpose; no urea formaldehyde or volatile organic compounds.
- B. Fasteners: Nails, screws and other anchoring devices of size, material, finish and type to suit application to provide secure attachment, concealed where possible; stainless steel or hot-dipped galvanized finish, complying with ASTM A153 in exposed locations of high humidity and at all exterior locations.
- C. Concealed Joint Fasteners: Threaded steel.
- D. Lumber for Shimming, Cleats, Blocking, and Furring: Softwood or hardwood lumber, kiln dried to less than 15% moisture content.
- E. Joint Sealant: Mildew-resistant silicone sealant, clear.

2.05 FABRICATION - GENERAL

- A. The millwork details represented on the Drawings are not intended to indicate all of the framing, blocking and panel support required for the proper installation of millwork. It shall be the Contractor's responsibility to properly detail such work for lasting strength and stability, and to accurately represent it on shop drawings.
 - 1. Note: There shall be no unfinished wood products. If not covered with laminate products or otherwise finished, all wood surfaces shall be receive a minimum of one coat of sealer in concealed or semi-concealed areas.
- B. In general, woodwork shall be assembled and installed using concealed fasteners, unless otherwise approved by the Architect. Fasteners shall be concealed, blind nailed, or countersunk with matching plugs. Secure woodwork to anchors or blocking built-in or directly attached to substrates.
- C. Joints in all work shall be tight and formed to conceal shrinkage.
- D. Complete fabrication in the shop, including assembly, finishing, and hardware application, to the maximum extent possible, before shipment to the site. Disassemble components only as necessary for shipment and installation.
- E. Fit exposed sheet material edges with edging as indicated on the Drawings. Use one piece for full length only.
- F. Condition woodwork to average prevailing humidity conditions in installation areas before installation. Install woodwork level, plumb, true and straight to a tolerance of 1/8" to 96 inches. Shim as required with concealed shims. Scribe and cut woodwork to fit, and refinish cut surfaces and repair damaged finish at plastic trim.
- G. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting. Closure panels/strips, end panels and trim shall be provided as required for a complete, finished installation.
- H. Solid Surfacing Fabrication Tolerances:
 - 1. Variation in component size: 1/8".
 - 2. Location of openings: 1/8" from indicated location.

2.06 WINDOW SILL FABRICATION

- A. Fabricate in accordance with standards governing fabrication quality that are specified in herein. Field conditions shall be carefully measured prior to fabrication of countertops.
- B. Solid Surface Window Sills:
 - 1. Fabricate window sills full width of openings, without joints.
 - 2. All edges shall be tooled smooth and square.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Verify adequacy of backing and support framing. Verify type of support framing for determination of proper fastener type.
- B. See Section 06 10 54 – Wood Blocking and Curbing, for installation of concealed wood blocking.
- C. Acclimate millwork items to temperature and relative humidity of the installation site for at least 24 hours prior to installation.

3.02 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for grade indicated.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.04 SITE APPLIED WOOD TREATMENT

- A. All millwork which will be in contact with concrete or masonry surfaces after setting, shall be back primed by the painting subcontractor, who shall be notified that the millwork is ready for back priming in ample time to permit application and drying of the required paint or finish before installation is scheduled to start.

3.05 WINDOW SILL INSTALLATION

- A. Securely attach window sills to blocking using concealed fasteners and with contact surfaces set in waterproof glue. Verify that window sill top surfaces are level. Shim where required.

3.06 TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.
- C. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- D. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- E. Countertop Field Joints: 1/8 inch wide, maximum.

3.07 CLEANING AND PROTECTION OF WORK

- A. Erect and maintain temporary protective barriers until such time as permanent construction is in place and all danger of damage or defacement is past.
- B. Repair damaged and defective woodwork, where possible to eliminate functional and visual defects. Where not possible to repair, replace woodwork. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.

3.08 ADJUSTING

- A. Adjust moving or operating parts to function smoothly and correctly. Touch-up finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 07 11 13
BITUMINOUS DAMPPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Bituminous dampproofing for the following applications:
 - 1. Structural steel columns and base plates in earth or concrete at the building perimeter.

1.02 REFERENCE STANDARDS

- A. ASTM D1187 - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal; 2011.
- B. ASTM D1227 - Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing; 2013.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide properties of primer, bitumen, and mastics.
- C. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.04 FIELD CONDITIONS

- A. Maintain ambient temperatures above 40 degrees F for 24 hours before and during application until dampproofing has cured.

PART 2 PRODUCTS

2.01 DAMPPROOFING PRODUCTS

- A. Bituminous Dampproofing: Cold-applied water-based emulsion; asphalt with mineral colloid or chemical emulsifying agent; with or without fiber reinforcement; asbestos-free; suitable for application on vertical and horizontal surfaces.
 - 1. Composition - Vertical Application: ASTM D1227 Type III or ASTM D1187 Type I.
 - 2. Composition - Horizontal and Low-Slope Application: ASTM D1227 Type II or III.
 - 3. VOC Content: Not more than permitted by local, State, and federal regulations.
 - 4. Applied Thickness: 1/16 inch, minimum, wet film.
 - 5. Products:
 - a. Sealastic Emulsion Type II (brush/spray-grade) by WR Meadows Inc.
 - b. 920-AF Fibered Emulsion Mastic (trowel grade) by Karnak.
 - c. 220-AF Fibered Emulsion Dampproofing (brush or spray grade) by Karnak.
 - d. HE780 by Henry
 - e. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Primers, Mastics, and Related Materials: Type as recommended by dampproofing manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of dampproofing system.
- C. Verify that items that penetrate surfaces to receive dampproofing are securely installed.

3.02 PREPARATION

- A. Protect adjacent surfaces not designated to receive dampproofing.
- B. Clean and prepare surfaces to receive dampproofing in accordance with manufacturer's instructions.
- C. Do not apply dampproofing to surfaces unacceptable to manufacturer. Do not apply over frost-covered surfaces.
- D. Apply mastic to seal penetrations, small cracks, or minor honeycomb in substrate.
- E. Use material as it comes in the container; thinning shall not be permitted.
- F. Do not apply dampproofing when temperature is below 40 degrees F.

3.03 APPLICATION

- A. Prime surfaces in accordance with manufacturer's instructions.
- B. Apply bitumen with mop (brush).
- C. Apply dampproofing in one coat, continuous and uniform, at a rate of 3 pounds/sq ft per coat.
- D. Apply from 2 inches below finish grade elevation down to top of footings.
- E. In general, dampproofing of retaining walls shall begin four (4) inches below finish grade and extend continuously to six (6) inches below level of finish grade on opposite side of wall.
- F. Seal items projecting through dampproofing surface with mastic. Seal watertight.
- G. Coordinate installation so that dampproofing may serve as mastic for insulation, where applicable.
- H. Immediately backfill against dampproofing to protect from damage.

END OF SECTION

SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rigid board insulation at cavity wall construction, perimeter foundation wall and underside of floor slabs.
- B. Acoustic batt insulation in interior partitions.
- C. Thermal batt insulation at miscellaneous locations indicated per the Drawings.
- D. Firesafing insulation.
- E. Under-slab vapor retarder.
- F. Foam insulation sealant for joints and small gaps.
- G. Adhesives, stick clips, tape, spring clips, etc.

1.02 RELATED REQUIREMENTS

- A. Section 03 30 00 - Cast-in-Place Concrete: Installation of underslab vapor barrier and insulation boards.
- B. Section 07 21 19 - Foamed-In-Place Insulation: Plastic foam insulation other than boards.
- C. Section 07 25 00 - Weather Barriers.
- D. Section 07 55 00 – Modified Bituminous Membrane Roofing: Insulation specified as part of roofing system.
- E. Section 07 84 00 - Firestopping: Safing insulation as a component of firestopping assemblies.
- F. Section 09 21 16 - Gypsum Board Assemblies: Partitions for acoustic insulation.

1.03 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2010.
- B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.
- C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2014.
- D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
- E. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- H. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials; 2010.

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. Samples: Upon request, submit samples of each type of material to be used.

1.05 MOCK-UPS

- A. Mock-Ups: Provide insulation for exterior wall mock-ups specified in Section 04 20 00 and Section 07 42 13.
- B. Mock-up panels shall demonstrate actual wall construction, detailing and workmanship.

- C. No work shall progress until the Architect has reviewed mock-up panels. Panels shall be revised as necessary to secure the Architect's acceptance and shall then become the standard of comparison for all related exterior wall work.
- D. Mock-up panels shall not be destroyed or moved until the Work is complete and accepted by the Architect. Upon completion of construction, mock-ups shall be removed.

1.06 FIELD CONDITIONS

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

1.07 PROTECTION, HANDLING AND STORAGE

- A. Protect plastic insulation from exposure to sunlight, except as necessary for period of installation and concealment. Protect plastic insulation against ignition at all times. Do not deliver plastic insulation materials before installation time. Complete installation and concealment of plastic materials as quickly as possible.

PART 2 PRODUCTS

2.01 APPLICATIONS

- A. Rigid Under-slab Insulation Board: Extruded polystyrene board.
- B. Rigid Perimeter Insulation Board at Foundations: Extruded polystyrene board.
- C. Rigid Insulation Board within Wall Cavities, Continuous: Polyisocyanurate insulation board.
- D. Acoustic Glass Fiber Batt Insulation: For metal framed walls and above ceilings.
- E. Mineral Fiber Board Insulation at Curtainwall assemblies.
- F. Safing Insulation: Mineral fiber firestopping insulation.

2.02 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene Board Insulation: ASTM C578, Type IV; Extruded polystyrene board with either natural skin or cut cell surfaces.
 - 1. Surface Burning Characteristics, ASTM E84: Flame Spread Index: 5 or less, Smoke Developed Index 145 or less.
 - 2. Board Size: 24 x 96 inch.
 - 3. Board Thickness:
 - a. Under-slab: 2 inches, continuous 4 feet coverage from perimeter edge.
 - b. Perimeter Foundation Walls: 2 layers of 1 inch, staggered joints, full height.
 - c. Slab Edge: 1 inch, continuous.
 - d. Other Locations: Thickness for specific conditions as indicated on the Drawings.
 - 4. Board Edges: Square.
 - 5. Thermal Resistance at 75 degrees F: 5.0 per inch.
 - 6. Compressive Resistance: 25 psi, unless otherwise specified.
 - a. Slab Edge: 60 psi.
 - 7. All joints and gaps between insulation board shall be sealed with foam sealant compatible with the insulation board
 - 8. Water Absorption, maximum: 0.1 percent, volume.
 - 9. Products for Under-slab and Rigid Perimeter Insulation:
 - a. Styrofoam by Dow Chemical Co.
 - b. Foamular 250 by Owens Corning Corp.
 - 10. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Polyisocyanurate Insulation Board: Rigid cellular foam, complying with ASTM C 1289; Type II, Class 2, polymer bonded glass fiber mat both faces.
 - 1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 - 2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.

3. Complies with fire-resistance requirements shown on the drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 - a. See the attached Basis of Design Manufacturer Wall Assembly Guide Summary attached to the end of this section for reference.
4. Compressive Strength: 20 psi.
5. Board Size: 48 x 96 inch.
6. Board Thickness:
 - a. Wall Cavity: 2 1/2 inches.
 - b. Miscellaneous Details: As indicated on the Drawings.
7. Long-Term Thermal Resistance: Minimum R-5.6 per inch.
8. Board Edges: Square.
9. Product: (Basis of Design for an approved NFPA 285 system)
 - a. Xci CG by Hunter Panels LLC.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 FIBER BOARD INSULATION MATERIALS

- A. Mineral Fiber Board Insulation: Semi-rigid mineral fiber, ASTM C612 or C553; unfaced.
 1. Applications: Wall cavity voids formed between new curtainwall assemblies and existing perimeter concrete structures/CMU perimeter wall partitions and where indicated on the Drawings.
 2. Surface Burning Characteristics, ASTM E84: Flame Spread Index 0, Smoke Developed Index: 0 (zero).
 3. Board Thickness: Two layers, stagger joints.
 - a. Layer 1: 2.5 inches, thickness.
 - b. Layer 2: 4 inches, thickness.
 4. Thermal Resistance, ASTM C518: R-value of 4.2 deg F sq ft/Btu at 75 degrees F, min.
 5. Dual Density: 3.5 inner lb/cu ft.min.
 6. Products:
 - a. Curtainrock by Roxul Inc.
 - b. Alternate Manufacturer's:
 - 1) Thermafiber Owens Corning.
 - 2) Johns Manville
 - 3) Substitutions: See Section 01 60 00 - Product Requirements.

2.04 BATT INSULATION MATERIALS

- A. Glass Fiber Batt Insulation: (Acoustic) ASTM C665; flexible preformed batt or blanket, friction fit; minimum 25% recycled content.
 1. Surface Burning Characteristics, ASTM E84: Flame Spread Index 25 or less; Smoke Developed Index 450 or less.
 2. Formaldehyde Content: Zero.
 3. Thicknesses:
 - a. Partitions: 3 inches
 - b. Above ceilings: 6 inches (Music and kitchen).
 4. Facing: Unfaced within stud walls. Poly wrapped above ceilings.
 5. Products:
 - a. Sound Shield Free by Johns Manville.
 - b. EcoBatt by Knauf.
 - c. ComfortTherm by Johns Manville. (poly wrapped)
 - d. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Mineral Fiber Batt Insulation: (Thermal) Flexible preformed batt or blanket, ASTM C665; friction fit, unfaced.
 1. Surface Burning Characteristics, ASTM E84: Flame spread index 0; Smoke developed index 0.
 2. Thermal Resistance: R-value of 4 per inch.

3. Products:
 - a. Thermafiber, Inc.
 - b. ComfortBatt by Roxul.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 4. Where thickness is not indicated, furnish the maximum thickness appropriate for the proposed application.
- C. Fiber Firestopping Insulation (Safing Insulation): ASTM C665 Type 1, unfaced, high-melt mineral fiber batt and have the following properties:
1. Thickness: 2 inch minimum thickness, and as required by tested assemblies.
 2. Density, ASTM D1622: 4 pcf.
 3. Surface Burning Characteristics, ASTM E84: Flame Spread Index 15, Smoke Developed Index 0.
 4. Water Absorption, ASTM C 272: 0.1% by volume
 5. Accessories: Manufacturer's "Z" impaling clips as required.
 6. Products:
 - a. Thermafiber by USG.
 - b. Safing Insulation / MW by Owens Corning Insulation
 - c. For Curtainwalls: Foil-faced Thermafiber Curtainwall Insulation by USG.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 FOAM INSULATION SEALANT

- A. Foam Insulation Sealant: Expanding, low VOC, HCFC-free, urethane foam sealant
1. Products:
 - a. Pur Fil IG 750 Foam by Todol Products, Inc.
 - b. Great-stuff Pro by Dow Chemical Co.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 ACCESSORIES

- A. Fasteners and Adhesive: As recommended by the insulation manufactures and as approved by Factory Mutual, material manufacturers, and related codes where applicable. In general, adhesives and fasteners shall be "Construction Grade", corrosion resistant stainless steel or galvanized, as suitable for damp locations.
- B. Adhesive: Type recommended by insulation manufacturer for application.
- C. Tape: For furred wall insulation board; bright aluminum self-adhering type, reinforced, 2 inches wide.

2.07 UNDERSLAB VAPOR RETARDER

- A. Underslab Vapor Retarder: Multi-ply, reinforced polyethylene, ASTM E1745, stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.
1. Water Vapor Permeance, ASTM E96: 0.03 perms max.
 2. Puncture Resistance, ASTM D1709: 475 min
 3. Tensile Strength, ASTM D882: 45 lbf/in min.
 4. Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations air-tight in vapor retarder.
- B. Products:
- a. Griffolyn Type 65 by Reef Industries Co.
 - b. Moistop by Fortifiber Building Systems; 15mil minimum
 - c. Ply-Bar Plus II by Firstline Corp.
 - d. Stego Wrap Class C by Stego Industries; 15mil minimum
 - e. Husky Yellow Guard by Poly-America L.P.; 15mil minimum

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. Exterior foundation wall perimeters shall have vertical rigid insulation installed from bottom of slab to top of footing.
- B. Apply adhesive to back of boards in a pattern to ensure adhesion to the foundation, and to other boards.
- 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.
 - 4. Install boards in 2 layers with joints staggered.
- D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Exterior wall perimeters shall have horizontal rigid insulation installed for a width of four (4) feet, continuously placed below the underslab vapor retarder.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and slab.

3.04 UNDERSLAB VAPOR RETARDER INSTALLATION

- A. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab. Vapor retarder shall be installed over entire area with seams lapped 12 inches and taped continuously. All penetrations shall be taped continuously. Edge of retarder shall be sealed against foundation wall.
 - 1. NOTE: Under slab vapor retarder installation shall be inspected prior to concrete pour and all penetrations, tears, disturbed areas, loose seams shall be repaired and re-inspected prior to commencement of concrete pour.

3.05 BOARD INSTALLATION AT CAVITY WALLS AND BEHIND SIDING

- A. Apply adhesive to back of boards in a pattern to ensure adhesion to the weather barrier or secure boards mechanically to studs with fasteners recommended by the manufacturer.
- B. At cavity walls, install boards to fit snugly between wall ties.
- C. Install boards horizontally on walls.
 - 1. Install in running bond pattern.
 - 2. 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. All joints and gaps between insulation boards shall be sealed with foam sealant compatible with the insulation board.

3.06 FIBEROUS BATT AND BOARD INSTALLATION

- A. Install fibrous board and batt insulation in accordance with manufacturer's instructions.
- B. Install thermal insulation at miscellaneous exterior wall and roof spaces without gaps or voids. Do not compress insulation.
- C. Install acoustic insulation between studs and other materials. Friction fit to prevent sliding and sagging. Provide additional clips and fasteners as required.
- D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

- E. Fit insulation completely to fill cavities and behind mechanical and electrical services within the plane of the insulation.
- F. All fibrous batt and board insulation shall be isolated from occupiable building spaces by gypsum board or other approved finish. Exposed insulation shall not be permitted in habitable areas.

3.07 SAFING INSULATION

- A. Install insulation as part of firestopping and smoke sealing in all floor/ceiling assembly penetrations, as required by fire sealant manufacturer's tested assemblies, as indicated on the Drawings, or as otherwise required for uninterrupted fire and smoke protection. Coordinate installation with Firestops and Smoke seals specified in Section 07 84 00 - Firestopping. NOTE: Unless specifically noted otherwise, firesafing insulation shall serve as back-up firestopping at penetrations. The primary firestopping shall be firestops as specified in Section 07 84 00 - Firestopping.
- B. Insulation shall be cut to fit snugly and neatly with the smooth face toward the visible side. Where small pieces are used to close holes or gaps, they shall be neatly packed into the opening to be filled, out of view. Provide concealed mechanical fasteners as required.

3.08 FOAM INSULATION SEALANT INSTALLATION

- A. Install foam insulation sealant continuously to completely fill all gaps and voids at insulation boards, at voids in deck flutes, at voids around window and door frames, and at locations as indicated on the Drawings.
- B. Install foam insulation following manufacturer's instructions and recommendations. Exercise caution not to overfill voids. Insulation shall be permitted to expand without causing the deflection of adjacent materials. Use non-expanding foam at perimeters of doors and windows.

END OF SECTION

SECTION 07 21 19
FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Foamed-in-place insulation for miscellaneous locations at the exterior wall and roof edge as indicated on the Drawings.

1.02 RELATED REQUIREMENTS

- A. Section 07 21 00 - Insulation: Foamed insulation sealant.

1.03 REFERENCE STANDARDS

- A. ASTM C1029 - Standard Specification for Spray-Applied Rigid Cellular Polyurethane Thermal Insulation; 2010.
- B. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- C. ASTM D1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics; 2008.
- D. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2012.
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials; 2014.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene one month prior to commencing work of this Section.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, preparation requirements, fire test reports, VOC content, MSDS sheets, certified test reports showing compliance with specified performance values and verification of minimum foam thickness to achieve the specified R-value.
- C. Samples:
 - 1. Submit 12" x 12" sample of insulation on specified substrate.
 - 2. Submit daily test shot samples of foamed-in-place insulation from each batch of foam.
- D. Certificates:
 - 1. Certify in writing that products of this section meet or exceed specified requirements.
 - 2. Certify in writing acceptance of all substrate surfaces prior to insulation installation.
 - 3. Certify in writing installer is approved by the manufacturer.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this Section, with not less than fifteen years of documented experience.
- B. Applicator Qualifications: Applicator shall be trained and certified by the insulation manufacturer, shall specialize in performing work of the type specified, with minimum five years of experience.
- C. Conform to applicable code for flame and smoke limitations.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered in manufacturer's original sealed containers clearly labeled with manufacturer's name, product identification, safety information, net weight and expiration date.
- B. Materials shall be stored in a safe manner within temperature limits specified by the materials manufacturer.

1.08 FIELD CONDITIONS

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
- B. Do not apply foam when temperature is within 5 F of dew point.
- C. Do not apply to unsatisfactory substrate conditions.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Foamed-In-Place Insulation: 2-component closed cell spray polyurethane foam system, non-CFC or HCFC blowing agent, ASTM C1029 Type II.
 - 1. Installed Thickness: 3 inches or as indicated on the Drawings.
 - 2. Surface Burning Characteristics, ASTM E84: Flame Spread Index of 25 or less, Smoke Developed Index of 350 or less.
 - 3. Thermal Resistance R value aged, ASTM C518: 6.7 min. per inch.
 - 4. Water Vapor Transmission, ASTM E96: 0.7 perms max. at 2" thickness.
 - 5. Air Infiltration, ASTM E283: At 1.57 psf, <0.001 cfm/sq ft; At 6.24 psf, <0.001 cfm/sq ft.
 - 6. Water Absorption, ASTM D2842: 0.60% volume.
 - 7. Compressive Strength, ASTM D1621: 26 PSI min.
 - 8. Density, ASTM D1622: 2.0 PCF.
 - 9. Dimensional Stability, ASTM D2126: -0.47% at -20 F and 5.9% at 100 F.
 - 10. Products:
 - a. Walltite by BASF
 - b. Corbond III by Johns Manville.

2.02 ACCESSORIES

- A. Primer: Required, by insulation manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.
- C. Examine substrate surfaces to receive insulation system materials and conditions under which the system will be installed. Do not proceed with the Work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the system installer and in compliance with the system manufacturer's standards.
 - 1. Prior to beginning work, examine all substrates for soundness, such as tightness of connections, crumbling or looseness of surface, and other conditions that would affect the installation.
 - 2. Notify the Contractor and Architect of any adverse or unsatisfactory conditions. Work shall not proceed until such conditions are corrected and conditions are accepted by the insulation system contractor.
- D. The insulation contractor shall submit a certificate stating acceptance of all substrate surfaces prior to installation of the insulation system, including, but not limited to:
 - 1. Structural Steel and/or Miscellaneous Metals are clean, dry, free of ice and snow, free of oils or other contaminants, smooth, free of depressions, waves, projections and other detrimental features for the insulation system installation.
 - 2. Substrate surfaces are solidly supported and secured.
 - 3. Substrate surfaces are suitable for proper bonding of the insulation system materials.

3.02 PREPARATION

- A. Mask and protect adjacent surfaces from over spray or dusting.

- B. Ventilate area to receive insulation and follow manufacturer's instructions for safe working conditions for workers and where applicable, building occupants.
- C. Apply primer in accordance with manufacturer's instructions.
- D. Verify that installed components are secured appropriately so that expansion of foam does not cause their displacement.

3.03 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions. Insulation shall be installed at a thickness of no more than 2.75 inches per pass.
- B. Apply insulation by spray method, to a uniform monolithic density without voids, in consecutive passes. Observe installation tolerance from specified thickness.
- C. Measures shall be taken to contain field trimmings of over-sprayed areas. They shall be removed on a regular basis to minimize trimmings from being blown around the site.
- D. Monitor and maintain the component ratio and mix of the components of the urethane chemicals in accordance with the manufacturer's product requirements. See Field Quality Control below.
- E. Sealant is required at all locations requiring an infiltration seal, that are too small for foam sealant (1/8 inch or less).
- F. Apply to achieve minimum specified cured thickness.
- G. Patch damaged areas.
- H. It is intended that all areas of foam insulation within the building envelop shall be separated from the interior by gypsum board thermal barrier.

3.04 FIELD QUALITY CONTROL

- A. Field inspections and tests shall be performed by an independent testing agency under provisions of Section 01 40 00 and shall include:
 - 1. Verification of insulation and overcoat thickness and density.
- B. Field monitoring and testing shall be performed by the insulation system contractor under provisions of Section 01 40 00 and shall include:
 - 1. Insulation system contractor shall monitor and maintain the component ratio and mix; component temperatures; in accordance with the manufacturer's product recommendations to achieve the desired density and physical properties. Verify product component ratio with flow meters and programmable ratio monitoring equipment to ensure insulation product conforms to the manufacturer's prescribed limits.
 - a. Submit monitoring records during the progress of the work on a daily basis.
 - 2. Test samples: Insulation system contractor shall submit daily test shot samples of insulation from each batch of foam. Sample size shall comply with industry standards. Samples shall be marked for date, batch number, location where installed in the building.

3.05 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07 24 00
EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Composite soffit cladding of rigid insulation and reinforced finish coating ("Class PB").

1.02 RELATED REQUIREMENTS

- A. Section 05 40 00 - Cold-Formed Metal Framing: Sheathing on metal studs.
- B. Section 07 62 00 - Sheet Metal Flashing and Trim: Perimeter flashings.
- C. Section 07 90 05 - Joint Sealers: Perimeter and penetration sealants.

1.03 REFERENCE STANDARDS

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2011.
- B. ASTM C297 - Standard Test Method for Flatwise Tensile Strength of Sandwich Constructions ; 2004 (Reapproved 2010).
- C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2015a.
- D. ASTM C1397 - Standard Practice for Application of Class PB Exterior Insulation and Finish Systems (EIFS) and EIFS with Drainage; 2013.
- E. ASTM D968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive; 2005 (Reapproved 2010).
- F. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2011.
- G. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2012.
- H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- J. ASTM E2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2003 (reapproved 2011).
- K. ASTM E2486/E2486M - Standard Test Method for Impact Resistance of Class PB and PI Exterior Insulation and Finish Systems (EIFS); 2013.
- L. ASTM G153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.
- M. ASTM G155 - Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Nonmetallic Materials; 2013.
- N. ICC-ES AC219 - Acceptance Criteria for Exterior Insulation and Finish Systems; 2009.
- O. ICC-ES AC235 - Acceptance Criteria for EIFS Clad Drainage Wall Assemblies; 2004 (Editorially revised 2009).
- P. NFPA 259 - Standard Test Method for Potential Heat of Building Materials; 2013.
- Q. NFPA 268 - Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies Using a Radiant Heat Energy Source; 2012.
- R. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components; 2012.

1.04 SUBMITTALS

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

- B. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
- C. Shop Drawings: Indicate soffit joint patterns, joint details, and molding profiles.
- D. Selection Samples: Submit manufacturer's standard range of samples illustrating available coating colors and textures.
- E. Verification Samples: Submit actual samples of selected coating on specified substrate, minimum 12 inches square, illustrating project colors and textures.
- F. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.05 QUALITY ASSURANCE

- A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site during installation.
- B. EIFS Manufacturer Qualifications: Provide EIFS products other than insulation from the same manufacturer with qualifications as follows:
 - 1. Member in good standing of EIMA (EIFS Industry Members Association).
 - 2. Manufacturer of EIFS products for not less than 10 years.
- C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.
- D. Installer Qualifications: Company specializing in the type of work specified and with at least ten years of documented experience .

1.06 MOCK-UP

- A. Construct mock-up of typical EIFS application on specified substrate, size as indicated on drawings, and including flashings, joints, and edge conditions.
- B. Mock-up may remain as part of the Work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to project site in manufacturer's original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.
- B. Storage: Store materials as directed by manufacturer's written instructions.

1.08 FIELD CONDITIONS

- A. Do not prepare materials or apply EIFS under conditions other than those described in the manufacturer's written instructions.
- B. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.
- C. Do not install coatings or sealants when ambient temperature is below 40 degrees F.
- D. Do not leave installed insulation board exposed to sunlight for extended periods of time.

1.09 WARRANTY

- A. See Section 01 78 10 - Warranties, for additional warranty requirements.
- B. Provide a joint installer's and manufacturer's installation and material warranty, covering a period of not less than 5 years. Inspections shall occur prior to the removal of staging.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Sto Corp; System StoTherm ci Lotusan.
- B. Other Acceptable Manufacturers:
 - 1. Dryvit Systems Inc.
 - 2. Parex USA Inc.

- C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 EXTERIOR INSULATION AND FINISH SYSTEM

- A. Exterior Insulation and Finish System: DRAINAGE type; reinforced finish coating on insulation board with drainage grooves adhesive-applied to water-resistive coating over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.
- B. Fire Characteristics:
1. Flammability: Pass, when tested in accordance with NFPA 285.
 2. Ignitibility: No sustained flaming when tested in accordance with NFPA 268.
 3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot.
- C. Adhesion of Water-Resistive Coating to Substrate: For each combination of coating and substrate, minimum flatwise tensile bond strength of 15 psi, when tested in accordance with ASTM C297/C297M.
- D. Adhesion to Water-Resistive Coating: For each combination of insulation board and substrate, when tested in accordance with ASTM C297/C297M, maximum adhesive failure of 25 percent unless flatwise tensile bond strength exceeds 15 psi in all samples.
- E. Water Penetration Resistance: No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.
- F. Drainage Efficiency: Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.
- G. Salt Spray Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM B117, using at least three samples matching intended assembly, at least 4 by 6 inches in size.
- H. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC219 or ICC-ES AC235.
- I. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycle 1, 5, or 9.
- J. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.
- K. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.
- L. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 113.5 gallons of sand.
- M. Impact Resistance: Construct system to provide the following impact resistance without exposure of broken reinforcing mesh, when tested in accordance with ASTM E2486/E2486M:
1. Standard: 25 to 49 in-lb, for areas not indicated as requiring higher impact resistance.

2.03 MATERIALS

- A. Finish Coating Top Coat: Single component acrylic-based coating, containing acrylic polymer, and colored pigments.
1. Texture: Sto Corp; Polymer-Enhanced Acrylic Stolit 1.0 Fine.

- B. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh.
- C. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating, weight, strength, and number of layers as required to meet required system impact rating.
- D. Insulation Board: Molded, expanded polystyrene board (EPS) ; ASTM C 578, Type I ; with the following characteristics:
 - 1. Grooved Board: Back side of board adjacent to sheathing grooved with vertical channels designed to allow moisture to drain; at drainage points provide board configuration that permits drainage to the exterior.
 - 2. Board Size: 24 by 48 inches.
 - 3. Board Size Tolerance: Plus/minus 1/16 inch from square and dimension.
 - 4. Board Thickness: 1 inches, minimum, and as indicated on the Drawings.
 - 5. Thickness Tolerance: Plus/minus 1/16 inch maximum.
 - 6. Board Edges: Square.
 - 7. Thermal Resistance (R factor per 1 inch (25.4 mm)) at 75 degrees F: 3.60.
 - 8. Compressive Resistance: 10 psi.
 - 9. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, when tested in accordance with ASTM E84.
- E. Water-Resistive Barrier Coating: Fluid-applied air and water barrier membrane; applied to sheathing; furnished or approved by EIFS manufacturer.

2.04 ACCESSORY MATERIALS

- A. Insulation Fasteners: Fastener and plate system appropriate for substrate and as recommended by EIFS manufacturer.
- B. Metal Flashings: As specified in Section 07 62 00.
- C. Trim: EIFS manufacturer's standard PVC or galvanized steel trim accessories, as required for a complete project and including starter track and drainage accessories.
- D. Sealant Materials: Compatible with EIFS materials and as recommended by EIFS manufacturer.
- E. Conditioners, Primers and other Accessories: As recommended by the manufacturer for a complete system installation.

PART 3 EXECUTION

3.01 GENERAL

- A. Install in accordance with EIFS manufacturer's instructions and ASTM C1397.
- B. Where different requirements appear in either document, comply with the most stringent.
- C. Neither of these documents supersedes the provisions of the Contract Documents that define the contractual relationships between the parties or the scope of work.

3.02 EXAMINATION

- A. Verify that substrate is sound and free of oil, dirt, other surface contaminants, efflorescence, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.
- B. Verify that substrate surface is flat, with no deviation greater than 1/4 in when tested with a 10 ft straightedge.

3.03 INSTALLATION - WATER-RESISTIVE BARRIER

- A. Apply barrier coating as recommended by coating manufacturer; prime substrate as required before application.

- B. Seal substrate transitions and intersections with other materials to form continuous water-resistive barrier on exterior of sheathing, using method recommended by manufacturer.
- C. At door and window rough openings and other wall penetrations, seal water-resistive barrier and flexible flashings to rough opening before installation of metal flashings, sills, or frames, using method recommended by manufacturer.
- D. Lap flexible flashing or flashing tape at least 2 inches on each side of joint or transition.

3.04 INSTALLATION - INSULATION

- A. Install in accordance with manufacturer's instructions.
- B. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.
- C. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch.
- D. Fill gaps greater than 1/16 inch with strips or shims cut from the same insulation material.
- E. Rasp irregularities off surface of installed insulation board.
- F. Mechanical Fastening: Space fasteners as recommended by EIFS manufacturer.

3.05 INSTALLATION - CLASS PB FINISH

- A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free, including back-wrap at terminations of EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.
 - 1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches.
 - 2. Allow base coat to dry a minimum of 24 hours before next coating application.
- B. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.
- C. Finish Coat Thickness: As recommended by manufacturer.
- D. Seal control and expansion joints within the field of exterior finish and insulation system, using procedures recommended by sealant and finish system manufacturers.
- E. Apply sealant at finish perimeter and expansion joints in accordance with Section 07 90 05.

3.06 CLEANING

- A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

3.07 PROTECTION

- A. Protect completed work from damage and soiling by subsequent work.

END OF SECTION

SECTION 07 25 00
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Weather Barrier System: Membrane, transition membrane and wall flashings for a complete system to perform as a combined continuous air and water barrier that is vapor permeable.

1.02 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry: Drip flashing installed in conjunction with weather barrier membrane flashing.
- B. Section 05 40 00 - Cold Formed Metal Framing: Sheathing substrate for weather barrier.
- C. Section 07 21 00 - Thermal Insulation: Rigid cavity wall insulation board, NFPA 285 compliance.
- D. Section 07 55 00 – Modified Bituminous Membrane Roofing: Insulation specified as part of roofing system.
- E. Section 07 90 05 - Joint Sealers: Sealant materials and installation techniques.

1.03 DEFINITIONS

- A. 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.
- B. 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, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$.
- C. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture-resistant, to the degree specified, intended to send water to outside of the wall assembly.

1.04 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- C. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
- C. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- D. ICC-ES AC38 - Acceptance Criteria for Water-Resistive Barriers; ICC Evaluation Service, Inc.
- E. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing; ICC Evaluation Service, Inc.; 2015.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics, performance criteria, and limitations.
- C. Shop Drawings: Provide drawings of special joint conditions, terminations, flashings, penetrations, window and door openings and treatment of substrate joints and cracks.
- D. Manufacturer's Installation Instructions: Indicate preparation.
- E. Samples: Submit representative samples of sprayed coating, sheet seal, transition membrane, and membrane wall flashing.
- F. Certifications and Field Reports:
 - 1. Submit certification by weather barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
 - 2. Submit weather barrier manufacturer's certification of compatibility of weather barrier with all materials in contact with it.

3. Prior to installation of weather barrier, submit written certification by the manufacturer that condition of existing substrate is acceptable for application of products submitted.
4. Submit copies of manufacturer's technical representative's field reports for each field visit.
 - a. The manufacturer technical representative shall include a minimum of (4) four site visits as follows:
 - 1) Site Visit #1: Pre-Installation meeting.
 - 1) Site Visit #2: During the initial demolition of existing wall fenestration to inspect exposed existing substrate surfaces scheduled to receive barriers.
 - 2) Site Visit #3: Post first initial installation of specified barriers. Manufacturer shall verify application is in conformance with manufacturer requirements.
 - 3) Site Visit #4: Upon 50% completion of related scope of work. The intent of this site visit is to ensure quality control and installation practices established at prior visits are maintained.
 - 4) Where installation concerns are noted additional site visits will be required to ensure that corrective measures given by the manufacturer have been completed in conformance with specifications and manufacturer instructions.

1.06 QUALITY ASSURANCE

- A. Manufacturer: Weather barrier systems shall be manufactured and marketed by a firm with a minimum of 20 years of experience in the production and sales of waterproofing. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five years.
- B. Installer: A company with at least five years of experience with the installation of products specified herein and having successfully completed other Projects of similar scope, and approved by the weather barrier manufacturer.
 1. Written confirmation or certification from the Waterproofing Manufacturer that the installer has been trained and is recognized by the manufacturer as suitable for the execution of the work.
 2. List of at least three projects contracted within the past five years of similar scope and complexity to this Project carried out by the firm and site supervisor.
- C. Materials Source Limitations: For each type of material required for the work of this Section, provide primary materials and weather barrier accessories that are the products of one manufacturer.

1.07 PERFORMANCE REQUIREMENTS

- A. General: Weather Barrier shall be capable of performing as a continuous air and water resistive barrier, flashed to discharge to the exterior incidental condensation or water penetration. Weather barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to embedded flashing, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

1.08 MOCK-UPS AND SAMPLE INSTALLATIONS

- A. Mock-Ups: Provide weather barrier system in exterior wall mocks as specified in Section 04 20 00 - Unit Masonry and Section 07 42 13.
 1. Mock-up panels shall demonstrate actual wall construction, detailing and workmanship.
 2. No work shall progress until the Architect has reviewed mock-up panels. Panels shall be revised as necessary to secure the Architect's acceptance and shall then become the standard of comparison for all related exterior wall work.
 3. Mock-up panels shall not be destroyed or moved until the Work is complete and accepted by the Architect. Upon completion of construction, mock-ups panels shall be removed.
- B. Sample Installation: Prior to commencement of the complete installation of the weather barrier system, a sample installation shall be provided to verify details, tie-ins and to demonstrate the required quality of materials, installation and workmanship.

1. The sample installation shall be applied to a constructed exterior wall section, 8 feet long and 8 feet wide, at a location to be determined by the Architect, incorporating brick shelf, window and door frame head, jamb and sill flashing and masonry ties.
2. No work shall progress until the Architect has reviewed the sample installation. Sample installation shall be revised as necessary to secure the Architect's acceptance.

1.09 PRE-INSTALLATION MEETING

- A. Pre-Installation Conference: A pre-installation conference shall be held at least two weeks prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include but not be limited to the following:
 1. Review of submittals.
 2. Review of surface preparation, minimum curing period and installation procedures.
 3. Review of special details and flashings.
 4. Sequence of construction, responsibilities and schedule for subsequent operations.
 5. Review of mock-up requirements.
 6. Review of inspection, testing, protection and repair procedures.
- B. Manufacturer's Representative: Make arrangements necessary to have a trained employee of the manufacturer on-site prior to installation, upon exposure of existing substrate for inspection, during initial application of barrier and at 50% completion; as well as any other necessary re-inspections during membrane work to review installation procedures. A field report shall be issued to the Contractor and Architect after each visit; indicating the quality of the work and identifying any issues and resolutions.

1.10 DELIVERY, STORAGE AND PROTECTION

- A. Materials shall be delivered in manufacturer's original sealed containers clearly labeled with manufacturer's name, product identification, safety information, net weight, and expiration date.
- B. Materials shall be stored in a safe manner within temperature limits specified by the materials manufacturer.
- C. Avoid spillage. Immediately notify Owner and Architect if spillage occurs and start clean up procedures. Clean spills and leave area as it was prior to spill.
- D. Observe safety and environmental measures indicated in manufacturer's MSDS, and mandated by federal, state and local regulations.

1.11 FIELD CONDITIONS

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

1.12 WARRANTY

- A. Provide the manufacturer's five year materials warranty, covering the primary weather barrier, accessory sealant and membrane materials against failure to cure, or achieve airtight and watertight seal, or to adhere.

PART 2 PRODUCTS

2.01 WEATHER BARRIER MATERIALS

- A. Weather Barrier - Fluid-Applied Coating: Fire-resistant, air barrier, liquid water drainage plane and vapor permeable system.
 1. Wet Film Thickness: \geq 70 mils.
 2. Dry Film Thickness: 30 mils.
 3. Application Temperature: 40 degrees F. minimum.
 4. Color: Un-cured medium blue; cured dark blue.
 5. VOC Content: <10 g/L
 6. Air Permeance, ASTM E2178: 0.02 L/s* sq m at 75 Pa. (0.004 cfm/sq ft at 1.57 lbf/sq ft)
 7. Water Vapor Permeance, ASTM E96A: 10 perms min.

8. Surface Burning Characteristics, ASTM E84: Flame Spread Index 25 max; Smoke Generated Index 450 max.
9. Products:
 - a. (Basis of Design) FR Barritech VP by Carlisle Coatings & Waterproofing, Inc.
 - b. Substitutions: See Section 01 40 00 - Product Requirements.
- C. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

2.02 SEALANTS

- A. Sealants: As recommended by the weather barrier system manufacturer for each application. Sealants shall have been tested for chemical and adhesive properties in relation to adjacent surface materials and approved in writing by the weather barrier system manufacturer.
- B. Sealant Backers: As specified in Section 07 90 05.
- C. Primers, Cleaners, and Other Sealant Materials: Required, as recommended by sealant manufacturer, appropriate to application, and compatible with adjacent materials.

2.03 ACCESSORIES

- A. Membrane Flashing: 40 mils total thickness; 32 mils self-adhesive rubberized asphalt integrally bonded to 8 mils cross-laminated high-density polyethylene film with disposable silicone-coated release paper.
 1. Permeance, ASTM E96: 0.05 perms.
 2. Puncture Resistance, ASTM D570: 40 lb, min.
 3. Products:
 - a. CCW-705 Self-Adhering Vapor/Air Barrier by Carlisle Coatings and Waterproofing.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Transition Membrane: 36 mils total thickness, 32 mils self-adhesive rubberized asphalt integrally bonded to 4 mil cross-laminated, high density polyethylene film with disposable silicone-coated release paper.
 1. Products:
 - a. CCW-705 Self-Adhering Vapor/Air Barrier by Carlisle Coatings and Waterproofings.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Surface Conditioner / Primer: Required, as recommended by coating manufacturer and suitable to the substrate.
- D. Thinners and Cleaners: As recommended by material manufacturer.
- E. Drip Flashing: Membrane flashing termination at exterior of masonry veneer. See 04 20 00 - Unit Masonry.
- F. Perimeter Transition Flashing System: Factory-fabricated silicone transition system to seal weather barrier membrane to aluminum curtain wall framing. See Section 08 44 13 - Glazed Aluminum Curtain Walls.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this Section. Notify the Contractor, in writing, of circumstances detrimental to the proper completion of the Work. Do not proceed with work until unsatisfactory conditions are corrected.
- B. Curtainwall and louver framing perimeters shall receive perimeter transition flashing system as a part of the work of those Sections. Notify the Contractor if perimeter transition flashing system is unsatisfactory for the installation of weather barrier tie-ins.

3.02 PREPARATION

- A. Remove dust, dirt, oils, loose or foreign matter which might impair adhesion of materials.

- B. Existing masonry walls and concrete substrates to receive barriers shall be inspected by the contractor and manufacturer technical representative. Commencement of the installation of the barrier shall be considered acceptance of the substrate as being suitable for the intended application. Any conditions that could adversely affect the installation shall be brought to the Contractor's attention, for resolution, prior to proceeding with the Work.
- C. Exterior substrates shall be sufficiently stabilized with corners and edges fastened with appropriate fasteners. Pre-treat all board joints with 2 to 3 inch wide, reinforced self-adhesive tape or fiberglass mesh style wallboard tape. Gaps greater than 1/4 inch shall be filled with mastic or sealant, fully cured before application of tape and sprayed coating.
- D. Prime masonry substrate surfaces to receive adhesives and self-adhering membrane in accordance with manufacturer's instructions.

3.03 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Apply sealants and adhesives within recommended application temperature ranges. Consult manufacturer if temperature is out of this range.
- C. Fluid-Applied Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Install sprayed coating over entire exterior surface; seal to adjacent construction with compatible sheet.
 - a. Spray with overlapping passes for a continuous uniform film thickness.
 - b. Carry coating into any openings a minimum of 2 inches.
 - c. Seal all penetrations as work progresses.
 - 3. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
 - 4. Use flashing to seal to adjacent construction and to bridge joints as recommended by system manufacturer. Provide backer rods to support membrane at joints to be bridged where required.
- D. Openings and Penetrations in Weather Barrier:
 - 1. Transition Membrane: After allowing the sprayed coating to cure to tack-free, apply transition membrane to overlap perimeter transition flashing system installed by others at door and window framing perimeters, roof and floor intersections, and changes in substrate. Use pre-cut, easily handled lengths for each location.
 - a. Remove release paper and position membrane flashing carefully before placing it against the surface. When properly positioned, place against surface by pressing firmly into place by hand roller. Overlap adjacent pieces 2 inches, or manufacturer's recommended amount and roll all seams with a hand roller. Seal to edge of flashing with termination mastic.
 - 2. Perimeter Transition Flashing System (for curtain wall framing): Coordinate installation of system flashing in curtain wall framing glazing pockets by the glazer and adhere leg for sealing to weather barrier neatly and completely. Corners shall be made with manufacturer's premade units.
 - 3. Membrane Flashing: Locate at heads of openings, items that bridge the cavity and other locations as indicated on the Drawings. Fully adhere flashing to substrate to prevent water from migrating under the flashing and seal top edge with termination mastic.
 - a. Remove release paper and position membrane flashing carefully before placing it against the surface. When properly positioned, place against surface by pressing firmly into place by hand roller. Overlap adjacent pieces 2 inches and roll all seams with a hand roller. Seal to edge of flashing with termination mastic.
 - b. Trim bottom edge 1/2 inch back from exposed face of the exterior wall. Flashing shall not be permanently exposed to sunlight. Flashing shall be adhered to top surface of metal flashing drip edge that shall project beyond face of exterior wall.

- c. At heads, sills and all flashing terminations, turn up ends a minimum of 2 inches and make careful folds to form an end dam, with the seams sealed.
 - d. Do NOT allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coat tar products or EPDM.
4. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.
 5. Treat construction joints and install flashing as recommended by manufacturer.

3.04 WASTE MANAGEMENT AND DISPOSAL

- A. Separate and recycle waste materials in accordance with the waste disposal plan. See Section 01 74 19. Place materials defined as hazardous or toxic waste in designated containers. Ensure emptied containers are stored safely for disposal.

3.05 FIELD QUALITY CONTROL

- A. Do not cover installed weather barriers until required inspections have been completed.
- B. Obtain approval of installation procedures by the weather barrier manufacturer based on a mock-up installed in place, prior to proceeding with remainder of installation.
- C. Contractor's Responsibilities: The Contractor shall appoint one individual who shall be responsible for achieving an acceptable, water and air barrier installation. This individual shall be on-site throughout the installation of the weather barrier and shall observe sealing of all penetrations, door, window, curtain wall, storefront openings and sealing of weather barrier to roof air-vapor barrier to help ensure a proper installation.
- D. Weather barrier shall not be concealed until the installation has been accepted by the Owner and Architect.

3.06 PROTECTION AND CLEANING

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.
- B. Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures as recommended by the manufacturer.
- C. Protect membranes to avoid damage from other trades, and construction materials during subsequent operations.
- D. For cavity insulation boards, bonding of the insulation may be achieved if the insulation products are installed when the membrane is tacky.
- E. Schedule work to ensure that the weather barrier is covered as soon as possible after installation. Protect the installation from damage during subsequent operations. If the installation cannot be covered within 30 days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

END OF SECTION

SECTION 07 42 13
METAL WALL PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured metal panels for walls, with related flashings and accessory components.
- B. Engineered thermally broken cold formed steel sub-girt system for support of exterior metal wall panels, consisting of vertical girts, horizontal girt, thermal isolators and associated fasteners.

1.02 RELATED REQUIREMENTS

- A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wall framing and sheathing.
- B. Section 07 21 00 - Thermal Insulation: Exterior wall cavity insulation.
- C. Section 07 25 00 - Weather Barriers.

1.03 REFERENCE STANDARDS

- A. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2013.
- B. ASTM A792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit manufacturer's product data sheets on panels, supports, accessories, finish, trims and sealants.
- C. Shop Drawings:
 - 1. Wall & Soffit Panels: Indicate panel and soffit dimensions, materials, gages, layout, joints, construction details, sealant locations, locations and types of fastening and anchorage.
 - 2. Exterior Sub-Girt System: Submit engineered shop drawings indicating girt system components, interface with building framing and wall panels, dimensions, locations and types of fasteners, anchorage, opening details, design loading, and accessories. All shop shall bear the seal of a licensed structural engineer employed by the wall panel subcontractor, licensed in New Hampshire.
 - a. In conjunction with shops required here-in, submit a record copy statement by the structural engineer employed by the CFMF subcontractor per Section 05 40 00. Statement shall confirm structural calculations pertaining to the design requirements of the sub-girt system engineered per this Section have been received, and that the design of supporting CFMF systems meet the design requirements and applicable code as applicable.
- D. Structural Calculations:
 - 1. Submit girt framing system manufacturer's comprehensive analysis of design loads, including dead loads, live loads, wind loads and thermal movement, signed and sealed by a licensed engineer in New Hampshire, employed by the wall panel subcontractor.
- E. Samples:
 - 1. Submit manufacturer's full range of metallic and non-metallic colors, 3" x 3" minimum size on metal, for selection by the Architect.
 - 2. Submit samples of wall panels, full width by 10 inches minimum long, illustrating panel profile, finish color, sheen, and texture.
 - 3. Submit samples of girt system components.
 - 4. Submit samples of all manufacturer trims, clips, fasteners (concealed and exposed) and accessories unless otherwise directed by Architect.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum fifteen years of documented experience.
- B. Designer Qualifications: Design girt system under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in New Hampshire, employed by the wall panel subcontractor.
- C. Installer Qualifications: Company specializing in installing the products specified in this Section with minimum five years of documented experience and approved by the panel manufacturer.

1.06 PRE-INSTALLATION MEETING

- A. At least two weeks prior to start of installation of exterior wall insulation board and exterior siding attachment systems, meet at project site with installers of other work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.
- B. Review metal wall framing assemblies for potential interference and conflicts and coordinate layout and support provisions for interfacing work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Store prefinished material off ground and protected from weather. Prevent twisting, bending, or abrasion, and provide ventilation to stored materials. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials that may cause discoloration or staining of products.

1.08 WARRANTY

- A. See Section 01 78 00 - Project Close-out, for additional warranty requirements.
- B. Manufacturer Warranty (Metal Wall and Soffit Panel): Provide manufacturer's limited warranty covering degradation of metal wall panels and failure of factory-applied exterior finishes agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of 20 year period from date of Substantial Completion.
- C. Installer's warranty of metal wall panel systems, including agreement to repair or replace wall panels that fail within specified warranty period of two years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Wall Panels Type 1, horizontal:
 - 1. Basis of Design: Matrix Series MX 1.0 by Morin (a Kingspan Group Company)
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Metal Wall Panels Type 2, horizontal:
 - 1. Basis of Design: Matrix Series MX 2.0 by Morin (a Kingspan Group Company)
 - a. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Soffit Panels:
 - 1. Basis of Design: CF Series F-12 by Morin (a Kingspan Group Company)
 - a. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MANUFACTURED METAL PANELS

- A. Metal Wall Panel System - General: Factory fabricated prefinished metal panel system, site assembled.
 - 1. Provide exterior panels and subgirt framing assembly.

2. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall. See Structural Drawings for design wind speed.
 3. Design Pressure:
 - a. Interior Zone Design Pressure (Field): +28.5 psf; - 30 PSF.
 - b. Corner Zone Design Pressure: +28.5 psf, - 51.5 PSF.
 4. Maximum Allowable Deflection of Panel: 1/180 of span.
 5. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; and deflection of structural support framing.
 6. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.
 7. Fabrication: Formed true to shape, accurate in size, square, and free from distortion or defects; pieces of longest practical lengths.
 8. Corners: Factory-fabricated in one continuous piece with minimum 18 inch returns.
 9. Exterior Finish: 1.0 mil. Fluoropolymer (PVDF) Two Coat system: 0.2 mil primer with 0.8 mil Kynar 500 (70 percent) solid color coat.
 - a. Back of Panel Finish: Factory standard primer coating with a dry film thickness of 0.25 mil.
 10. Expansion Joints: Same material, thickness and finish as exterior sheets; manufacturer's standard brake formed type, of profile to suit system.
 11. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- B. Exterior Panels:
1. Profile: As specified.
 2. Panel Joint: Tongue and groove interlock joint.
 3. Material: Pre-coated aluminum sheet, 18 gage, 0.040 inch minimum thickness.
 4. Panel Width: 12 inches.
 5. Panel Thickness: 1 1/2 inches.
 6. Texture: Smooth.
 7. Color: As selected by Architect from manufacturer current standard color chart.
- C. Trim: Same material, thickness and finish as exterior sheets; brake formed to required profiles.
- D. Anchors: Stainless steel.
- E. Pre-coated Aluminum Sheet: ASTM B209 3105 alloy, smooth surface texture; continuous, -coil-coated on exposed surfaces with specified finish coating and on panel back with specified panel back coating.
- F. Trims and Caps: Manufacturer's standard type suitable for use with system, permanently resilient.
- G. Sealants:
1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane. Proposed color shall be approved by the Architect.
 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
- H. Fasteners: Manufacturer's standard concealed type to suit application; with soft neoprene washers, steel, hot dip galvanized. Fastener cap same color as exterior panel where applicable.
- I. Field Touch-up Paint: As recommended by panel manufacturer.

2.03 SUBGIRT SYSTEM

- A. Attachment system for exterior siding shall be capable of withstanding effects of load and stresses from dead loads, wind loads, snow loads and normal thermal movement without evidence of permanent defects of assemblies or components. See Structural Drawings for project load requirements and wall panel wind pressure requires above.

1. Furnish and install exterior continuous insulated wall assembly with no thermal bridges other than fastener to effectively control thermal, air and water performance. System shall include the following:
 - a. Cold-formed steel support and attachment framing system installed to exterior of rigid insulation, consisting of vertical and horizontal girts, thermal isolators and associated fasteners.
2. Structural Design: Exterior-insulated rain screen wall assemblies capable of withstanding effects of load and stresses from dead loads, wind loads, snow loads and normal thermal movement without evidence of permanent defects of assemblies or components.
3. Provide assemblies that allow for thermal movements, preventing buckling, opening of joints, overstressing of components and other detrimental effects:
4. Design and install sub-girt system to accommodate primary structural frame deflection criteria as indicated per the Drawings.
5. Maximum allowable deflection of span: $L/180$.
5. Submit façade attachment/support framing system manufacturer's comprehensive analysis of design loads, including dead loads, live loads, wind loads and thermal movement, signed and sealed by a licensed engineer in the applicable State.
6. Fasteners and accessories as required for a complete system.
7. Product (Basis of Design): CI System by Knight Wall Systems or equal.
8. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Inspect all panels.
- B. Verify that building framing members are ready to receive panels.
- C. Verify that weather barrier has been installed over substrate completely and correctly.

3.02 SUB-GIRT SYSTEM INSTALLATION

- A. Preparation: Verify vertical girt spacing and framing clearances relative to studs or other points of attachment.
- B. Install according to manufacturer's recommendations and engineering requirements.
 1. Mount vertical box girts, fastened at spacing as determined by engineering calculations overtop of installed rigid insulation as indicated by engineering.
 2. Check plumb of vertical girts both parallel and perpendicular to the structure.
- C. Install subgirts perpendicular to panel length, securely fastened to substrates and shimmed and leveled to uniform plane. Space at intervals indicated on the engineered shop drawings.

3.03 PANEL INSTALLATION

- A. Install panels on soffits in accordance with manufacturer's instructions.
- B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Fasten panels to structural supports; aligned, level, and plumb.
- D. Locate joints over supports. Lap panel ends minimum 2 inches.
- E. Use concealed fasteners unless otherwise approved by Architect.

3.04 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

3.05 CLEANING

- A. Remove site cuttings from finish surfaces.

- B. Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 55 00
MODIFIED BITUMINOUS MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cold Applied 2-Ply Asphalt Roofing (StressPly, OptiMax). (2.2.)(3.4)

1.2 RELATED SECTIONS

- A. Section 05 30 00 - Metal Roof Deck.
- B. Section 06 10 54 – Wood Blocking and Curbing
- C. Section 07 21 00 – Thermal Insulation
- D. Section 07 62 00 - Sheet Metal Flashing and Trim: Weather protection for base flashings.
- E. Division 22 – Plumbing: Roof Drains.

1.3 REFERENCES

- A. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
- B. ASTM D 312 - Standard Specification for Asphalt used in Roofing.
- C. ASTM D 451 - Standard Test Method for Sieve Analysis of Granular Mineral Surfacing for Asphalt Roofing Products.
- D. ASTM D 1970 - Specification for Sheet Materials, Self-Adhering Polymer Modified Bituminous, Used as Steep Roofing Underlayment for Ice Dam Protection.
- E. ASTM D 1079 Standard Terminology Relating to Roofing, Waterproofing and Bituminous Materials.
- F. ASTM D 1227 Standard Specification for Emulsified Asphalt Used as a Protective Coating for Roofing.
- G. ASTM D 1863 Standard Specification for Mineral Aggregate Used as a Protective Coating for Roofing.
- H. ASTM D 2178 Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
- I. ASTM D 2822 Standard Specification for Asphalt Roof Cement.
- J. ASTM D 2824 Standard Specification for Aluminum-Pigmented Asphalt Roof Coating.
- K. ASTM D 4601 Standard Specification for Asphalt Coated Glass Fiber Base Sheet Used in Roofing.
- L. ASTM D 5147 Standard Test Method for Sampling and Testing Modified Bituminous Sheet Materials.

- M. ASTM D 6162 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fiber Reinforcements.
- N. ASTM D 6163 Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.
- O. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- P. ASTM D 6754 - Standard Specification for Ketone Ethylene Ester (KEE) Sheet Roofing.
- Q. ASTM D 6757 - Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing.
- R. ASTM E 108 - Standard Test Methods for Fire Test of Roof Coverings
- S. Factory Mutual Research (FM): Roof Assembly Classifications.
- T. National Roofing Contractors Association (NRCA): Roofing and Waterproofing Manual.
- U. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual.
- V. Underwriters Laboratories, Inc. (UL): Fire Hazard Classifications.
- W. Warnock Hersey (WH): Fire Hazard Classifications.
- X. ANSI-SPRI ES-1 Wind Design Standard for Edge Systems used with Low Slope Roofing Systems.
- Y. ASCE 7, Minimum Design Loads for Buildings and Other Structures
- Z. UL - Fire Resistance Directory.
- AA. FM Approvals - Roof Coverings and/or RoofNav assembly database.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform work in accordance with all federal, state and local codes.
- B. Exterior Fire Test Exposure: Roof system shall achieve a UL, FM or WH Class rating for roof slopes indicated on the Drawings as follows:
 - 1. Factory Mutual Class A Rating.
 - 2. Underwriters Laboratory Class A Rating.
 - 3. Warnock Hersey Class A Rating.
- C. Design Requirements:
 - 1. Uniform Wind Uplift Load Capacity
 - a. Installed roof system shall withstand negative (uplift) design wind loading pressures complying with the following criteria.
 - 1) Design Code: ASCE 7, Method 2 for Components and Cladding.
 - 2) Importance Category:
 - a) I.
 - 3) Importance Factor of:
 - a) 1.0
 - 4) Wind Speed: 100 mph
 - 5) Exposure Category:

- a) C.
- 6) Design Roof Height: Varies See Drawings.
- 7) Minimum Building Width: Varies See Drawings
- 8) Roof Pitch: 1/4 :12.
- 9) Roof Area Design Uplift Pressure: See Structural Drawings.
- 2. Snow Load: 38.5 PSF + Drift
- 3. Live Load: 20 psf, or not to exceed original building design.
- 4. Dead Load:
 - a. Installation of new roofing materials shall not exceed the dead load capacity of the existing roof structure.
- D. Roof system shall have been tested in compliance with the following codes and test requirements:
 - 1. International Code Council Evaluation Service (ICC-ES):
 - 2. FM Approvals:
 - a. RoofNav Website

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
- C. Shop Drawings: Submit shop drawings including installation details of roofing, flashing, fastening, insulation and vapor barrier, including notation of roof slopes and fastening patterns of insulation and base modified bitumen membrane, prior to job start.
- D. Design Pressure Calculations: Submit design pressure calculations for the roof area in accordance with ASCE 7 and local Building Code requirements. Include a roof system attachment analysis report, certifying the system's compliance with applicable wind load requirements before Work begins. Report shall be signed and sealed by a Professional Engineer registered in the State of the Project who has provided roof system attachment analysis for not less than 5 consecutive years.
- E. Verification Samples: For each modified bituminous membrane ply product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- F. Manufacturer's Certificates: Provide to certify products meet or exceed specified requirements.
- G. Test Reports: Submit test reports, prepared by an independent testing agency, for all modified bituminous sheet roofing, indicating compliance with ASTM D5147. Testing must be performed at 77 deg. F. Tests at 0 deg. F will not be considered.
- H. Manufacturer's Fire Compliance Certificate: Certify that the roof system furnished is approved by Factory Mutual (FM), Underwriters Laboratories (UL), Warnock Hersey (WH) or approved third party testing facility in accordance with ASTM E108, Class A for external fire and meets local or nationally recognized building codes.
- I. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic inspection and maintenance of all completed roofing work. Provide product warranty executed by the manufacturer. Assist Owner in preparation and

submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

- J. Manufacturer's Certificate: Certify that all products, including insulation, underlayment and related fasteners are satisfactory for their intended applications.
 - 1. In compliance with existing warranties to remain.

1.6 QUALITY ASSURANCE

- A. Perform Work in accordance with NRCA Roofing and Waterproofing Manual.
- B. Manufacturer Qualifications: Company specializing in manufacturing products specified with documented ISO 9001 certification and minimum of twelve years of documented experience and must not have been in Chapter 11 bankruptcy during the last five years.
- C. Installer Qualifications: Company specializing in performing Work of this section with minimum ten years documented experience and a certified Pre-Approved Garland Contractor.
 - 1. Installer must be experienced in the specific system application specified with no less than two projects of 100 square or larger within the past 3 years.
- D. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work while roofing work is in progress.
- E. Product Certification: Provide manufacturer's certification that materials are manufactured in the United States and conform to requirements specified herein, are chemically and physically compatible with each other, and are suitable for inclusion within the total roof system specified herein.
- F. Source Limitations: Obtain all components of roof system from a single manufacturer. Secondary products that are required shall be recommended and approved in writing by the roofing system Manufacturer. Upon request of the Architect or Owner, submit Manufacturer's written approval of secondary components in list form, signed by an authorized agent of the Manufacturer.

1.7 PRE-INSTALLATION MEETINGS

- A. Convene minimum two weeks prior to commencing Work of this section.
- B. Review installation procedures and coordination required with related Work.
- C. Inspect and make notes of job conditions prior to installation:
 - 1. Record minutes of the conference and provide copies to all parties present.
 - 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 - 3. Installation of roofing system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging with labels intact until ready for installation.
- B. Store all roofing materials in a dry place, on pallets or raised platforms, out of direct exposure to the elements until time of application. Store materials at least 4 inches above ground level and covered with "breathable" tarpaulins.
- C. Stored in accordance with the instructions of the manufacturer prior to their application or

installation. Store roll goods on end on a clean flat surface except store KEE-Stone FB 60 rolls flat on a clean flat surface. No wet or damaged materials will be used in the application.

- D. Store at room temperature wherever possible, until immediately prior to installing the roll. During winter, store materials in a heated location with a 50 degree F (10 degree C) minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- E. Avoid stockpiling of materials on roofs without first obtaining acceptance from the Architect/Engineer.
- F. Adhesive storage shall be between the range of above 40 degree F (4 degree C) and below 80 degree F (27 degree C). Area of storage shall be constructed for flammable storage.

1.9 COORDINATION

- A. Coordinate Work with installing associated metal flashings as work of this section proceeds.

1.10 PROJECT 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.

1.11 WARRANTY

- A. Upon completion of the work, provide the Manufacturer's written and signed Edge-To-Edge NDL System Warranty, warranting that, if a leak develops in the roof during the term of this warranty, due either to defective material or defective workmanship by the installer, the manufacturer shall provide the Owner, at the Manufacturer's expense, with the labor and material necessary to return the defective area to a watertight condition including Garland Metal Components.
 - 1. Warranty Period:
 - a. 30 years from date of acceptance on new roof areas
 - b. Continuation of existing warranty in effect for all re-worked areas
- B. Installer is to guarantee all work against defects in materials and workmanship for a period indicated following final acceptance of the Work.
 - 1. Warranty Period:
 - a. 5 years from date of acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garland Company, Inc. (The), which is located at: 3800 E. 91st St.; Cleveland, OH 44105; Toll Free Tel: 800-321-9336; Tel: 216-641-7500; Fax: 216-641-0633; Email:[request info \(\)](mailto:request info ()); Web:www.garlandco.com
 - 1. Contact: Scott Livernois, The Garland Company; 603-998-9694
- B. No Substitutions.

2.2 COLD APPLIED 2-PLY ROOF SYSTEM - STRESSPLY, OPTIMAX, OR VERSIPLY

- A. Base (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 - 1. FlexBase E 80:
- B. Modified Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:

1. StressPly EUV FR Mineral:
- C. Interply Adhesive: (1 and 2)
 1. Weatherking :
- D. Flashing Base Ply: One ply bonded to the prepared substrate with Interply Adhesive:
 1. FlexBase E 80:
- E. Flashing Cap (Ply) Sheet: One ply bonded to the prepared substrate with Interply Adhesive:
 1. StressPly EUV FR Mineral:
- F. Flashing Ply Adhesive:
 1. Weatherking Flashing Adhesive:

2.3 EDGE TREATMENT AND ROOF PENETRATION FLASHINGS

- A. Flashing Boot - Rubbertite Flashing Boot: Neoprene pipe boot for sealing single or multiple pipe penetrations adhered in approved adhesives as recommended and furnished by the membrane manufacturer.
- B. Vents and Breathers: Heavy gauge aluminum and fully insulated vent that allows moisture and air to escape but not enter the roof system as recommended and furnished by the membrane manufacturer.
- C. Pitch pans, Rain Collar 24 gauge stainless or 20oz (567gram) copper. All joints should be welded/soldered watertight. See details for design.
- D. Drain Flashings should be 4lb (1.8kg) sheet lead formed and rolled.
- E. Plumbing stacks should be 4lb (1.8kg) sheet lead formed and rolled.
- F. Liquid Flashing - Tuff-Flash: An asphaltic-polyurethane, low odor, liquid flashing material designed for specialized details unable to be waterproofed with typical modified membrane flashings.
 1. Tensile Strength, ASTM D 412: 400 psi
 2. Elongation, ASTM D 412: 300%
 3. Density @77 deg. F 8.5 lb/gal typical
- G. Fabricated Flashings: Fabricated flashings and trim are specified in Section 07620.
 1. Fabricated flashings and trim shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the CDA Copper Development Association "Copper in Architecture - Handbook" as applicable.
- H. Manufactured Roof Specialties: Manufactured copings, fascia, gravel stops, control joints, expansion joints, joint covers and related flashings and trim are specified in Section 07710.
 1. Manufactured roof specialties shall conform to the detail requirements of SMACNA "Architectural Sheet Metal Manual" and/or the NRCA "Roofing and Waterproofing Manual" as applicable.

2.4 INSULATION

- A. Insulation: Manufacturer as recommended by the roofing system manufacturer.
- B. Polyisocyanurate Board Insulation: Rigid cellular foam, complying with ASTM C1289, Type II, Class 2, polymer bonded glass fiber mat both faces and with the following characteristics:
 1. Compressive Strength: 25 psi
 2. Provide tapered boards where indicated for sloping to drain. Fabricate with taper of 1/4 inch per foot minimum. All roof drains shall be sumped in a 4' x 4' area.

3. Board Thickness: 2.0 inches in a minimum of 2 layers.
4. Total Minimum Insulation Board Thickness: Four (4) inches.
 - a. At patch/infill of existing roof areas provide total thicknesses to match existing unless otherwise indicated per the Drawings.
5. Long-term Thermal Resistance: R-value of 5.6 per inch min.
6. Board Edges: Square.
7. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Inspect and approve the deck condition, slopes and fastener backing if applicable, parapet walls, expansion joints, roof drains, stack vents, vent outlets, nailers and surfaces and elements.
- C. Verify that work penetrating the roof deck, or which may otherwise affect the roofing, has been properly completed.
- D. If substrate preparation and other conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. General: Clean surfaces thoroughly prior to installation.
 1. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
 2. Fill substrate surface voids that are greater than 1/4 inch wide with an acceptable fill material.
 3. Roof surface to receive roofing system shall be smooth, clean, free from loose gravel, dirt and debris, dry and structurally sound.
 4. Wherever necessary, all surfaces to receive roofing materials shall be power broom and vacuumed to remove debris and loose matter prior to starting work.
 5. Do not apply roofing during inclement weather. Do not apply roofing membrane to damp, frozen, dirty, or dusty surfaces.
 6. Fasteners and plates for fastening components mechanically to the substrate shall provide a minimum pull-out capacity of 300 lbs. (136 k) per fastener. Base or ply sheets attached with cap nails require a minimum pullout capacity of 40 lb. per nail.
 7. Prime decks where required, in accordance with requirements and recommendations of the primer and deck manufacturer.
- B. Metal Deck: Metal deck shall be installed as specified in Section
 1. Fastening of the deck should comply with the anticipated live and dead loads pertaining to the building as well as applicable Code.
 2. Steel decks shall be minimum 22-gauge factory galvanized or zinc alloy coated for protection against corrosion.
 3. Suitable insulation shall be mechanically attached as recommended by the insulation manufacturer.
 4. Decks shall comply with the gauge and span requirements in the current Factory Mutual FM Approval Guide and be installed in accordance with Loss Prevention Data Sheet 1-28 or specific FM approval.
 5. When re-roofing over steel decks, surface corrosion shall be removed, and repairs to

severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.

3.3 INSTALLATION - GENERAL

- A. Install modified bitumen membranes and flashings in accordance with manufacturer's instructions and with the recommendations provided by the National Roofing Contractors Association's Roofing & Waterproofing Manual, the Asphalt Roofing Manufacturers Association, and applicable codes.
- B. General: Avoid installation of modified bitumen membranes at temperatures lower than 40-45 degrees F. When work at such temperatures unavoidable use the following precautions:
 - 1. Take extra care during cold weather installation and when ambient temperatures are affected by wind or humidity, to ensure adequate bonding is achieved between the surfaces to be joined. Use extra care at material seam welds and where adhesion of the applied product to the appropriately prepared substrate as the substrate can be affected by such temperature constraints as well.
 - 2. Unrolling of cold materials, under low ambient conditions must be avoided to prevent the likelihood of unnecessary stress cracking. Rolls must be at least 40 degrees F at the time of application. If the membrane roll becomes stiff or difficult to install, it must be replaced with roll from a heated storage area.
- C. Commence installation of the roofing system at the lowest point of the roof (or roof area), working up the slope toward the highest point. Lap sheets shingle fashion so as to constantly shed water
- D. All slopes greater than 2:12 require back-nailing to prevent slippage of the ply sheets. Use ring or spiral-shank 1 inch cap nails, or screws and plates at a rate of 1 fastener per ply (including the membrane) at each insulation stop. Place insulation stops at 16 ft o.c. for slopes less than 3:12 and 4 feet o.c. for slopes greater than 3:12. On non-insulated systems, nail each ply directly into the deck at the rate specified above. When slope exceeds 2:12, install all plies parallel to the slope (strapping) to facilitate backnailing. Install 4 additional fasteners at the upper edge of the membrane when strapping the plies.

3.4 INSTALLATION COLD APPLIED ROOF SYSTEM

- A. Modified Cap Ply(s): Cut cap ply sheets into 18 foot lengths and allow plies to relax before installing. Install in interplay adhesive applied at the rate required by the manufacturer. Shingle sheets uniformly over the prepared substrate to achieve the number of plies specified. Shingle in proper direction to shed water on each large area of roofing.
 - 1. Lap ply sheet ends 8 inches. Stagger end laps 12 inches minimum.
 - 2. Solidly bond to the base layers with specified cold adhesive at the rate of 2 to 2-1/2 gallons per 100 square feet.
 - 3. Roll must push a puddle of adhesive in front of it with adhesive slightly visible at all side laps. Care should be taken to eliminate air entrapment under the membrane.
 - 4. Install subsequent rolls of modified across the roof as above with a minimum of 4 inch side laps and 8 inch staggered end laps. Lay modified membrane in the same direction as the underlayers but the laps shall not coincide with the laps of the base layers.
 - 5. Allow cold adhesive to set for 5 to 10 minutes before installing the top layer of modified membrane.
 - 6. Extend membrane 2 inches beyond top edge of all cants in full moppings of the cold adhesive as shown on the Drawings.
- B. Fibrous Cant Strips: Provide non-combustible perlite or glass fiber cant strips at all wall/curb detail treatments where angle changes are greater than 45 degrees. Cant may be set in approved cold adhesives, hot asphalt or mechanically attached with approved plates and

fasteners.

- C. Wood Blocking, Nailers and Cant Strips: Provide wood blocking, nailers and cant strips as specified in Section 06 10 54.
 - 1. Provide nailers at all roof perimeters and penetrations for fastening membrane flashings and sheet metal components.
 - 2. Wood nailers should match the height of any insulation, providing a smooth and even transition between flashing and insulation areas.
 - 3. Nailer lengths should be spaced with a minimum 1/8 inch gap for expansion and contraction between each length or change of direction.
 - 4. Nailers and flashings should be fastened in accordance with Factory Mutual "Loss Prevention Data Sheet 1- 49, Perimeter Flashing" and be designed to be capable of resisting a minimum force of 200 lbs/lineal foot in any direction.

- D. Metal Work: Provide metal flashings, counter flashings, parapet coping caps and thru-wall flashings as specified in Section 07 62 00. Install in accordance with the SMACNA "Architectural Sheet Metal Manual" or the NRCA Roofing Waterproofing manual.

- E. Termination Bar: Provide a metal termination bar or approved top edge securement at the terminus of all flashing sheets at walls and curbs. Fasten the bar a minimum of 8 inches (203 mm) o/c to achieve constant compression. Provide suitable, sealant at the top edge if required.

- F. Flashing Base Ply: Install flashing sheets by the same application method used for the base ply.
 - 1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 - 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 - 3. Adhere to the underlying base ply with specified flashing ply adhesive unless otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.
 - 4. Solidly adhere the entire flashing ply to the substrate. Secure the tops of all flashings that are not run up and over curb through termination bar fastened at 6 inches (152 mm) O.C. and sealed at top.
 - 5. Seal all vertical laps of flashing ply with a three-course application of trowel-grade mastic and fiberglass mesh.
 - 6. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
 - 7. Coordinate roof accessories, miscellaneous sheet metal accessory items, including piping vents and other devices with the roofing system work.
 - 8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.

- G. Flashing Cap Ply: Install flashing cap sheets by the same application method used for the base ply.
 - 1. Seal curb, wall and parapet flashings with an application of mastic and mesh on a daily basis. Do not permit conditions to exist that will allow moisture to enter behind, around or under the roof or flashing membrane.
 - 2. Prepare all walls, penetrations, expansion joints and where shown on the Drawings to be flashed with required primer at the rate of 100 square feet per gallon. Allow primer to dry tack free.
 - 3. Adhere to the underlying base flashing ply with specified flashing ply adhesive unless

otherwise specified. Nail off at a minimum of 8 inches (203 mm) o.c. from the finished roof at all vertical surfaces.

4. Coordinate counter flashing, cap flashings, expansion joints and similar work with modified bitumen roofing work as specified.
5. Coordinate roof accessories, miscellaneous sheet metal accessory items with the roofing system work.
6. All stripping shall be installed prior to flashing cap sheet installation.
7. Heat and scrape granules when welding or adhering at cut areas and seams to granular surfaces at all flashings.
8. Secure the top edge of the flashing sheet using a termination bar only when the wall surface above is waterproofed, or nailed 4 inches on center and covered with an acceptable counter flashing.

3.5 INSTALLATION EDGE TREATMENT AND ROOF PENETRATION FLASHING

- A. Pre-Manufactured Metal Edge System:
 1. Position base plies of the built-up and/or modified roofing membrane over the roof edge covering nailers completely, fastening 8 inches (203 mm) on center. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 2. Cant Dam: Install Cant Dam overlapping Cant a minimum of 1 inch. Fasten Cant Dam through the top of nailer and outside face in accordance with ANSI/SPRI ES-1 test report.
 3. BUR or Modified Flashing: Prime Cant Dam at a rate of 100 square feet per gallon and allow to dry.
 4. Strip in Cant Dam with base flashing membrane extending 6 inches (152 mm) into roof field, followed with a cap sheet extending 9 inches into the roof field. Install membrane and cap sheet with proper material and procedure according to manufacturer's recommendations.
 5. Fascia Cover: Install fascia cover with splice plate under one end by pressing downward firmly until "snap" occurs and cover is engaged along entire length of miter. Field cut where necessary with fine tooth saw.
 6. Sealant is to be placed between splice plates on metal edge pieces.
 7. Install a second ply of modified flashing ply in bitumen over the base flashing ply, 9 inches (228 mm) on to the field of the roof.

3.6 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs and structures, vehicles and utilities.
- B. Protect exposed surfaces of finished walls with tarps to prevent damage.
- C. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch (16 mm) thick.
- D. In addition to the plywood listed above, an underlayment of minimum 1/2 inch (13 mm) recover board is required on new roofing.
- E. Special permission shall be obtained from the Manufacturer before any traffic shall be permitted over new roofing.

3.7 FIELD QUALITY CONTROL

- A. Inspection: Provide manufacturer's field observations at pre-construction meeting, project start-up and at intervals of approximately 3 days per week during project progress. Provide a final inspection upon completion of the Work.

1. Warranty shall be issued upon manufacturer's acceptance of the installation.
2. Field observations shall be performed by a Technical Representative employed full-time by the manufacturer and whose primary job description is to assist, inspect and approve membrane installations for the manufacturer.
3. Provide observation reports from the Technical Representative indicating procedures followed, weather conditions and any discrepancies found during inspection.
4. Provide a final report from the Technical Representative, certifying that the roofing system has been satisfactorily installed according to the project specifications, approved details and good general roofing practice.

3.8 SCHEDULES

A. Base (Ply) Sheet:

1. FlexBase E 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base sheet reinforced with a fiberglass and polyester composite scrim, performance requirements according to ASTM D 5147.
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf/in XD 550 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 87.5 kN/m XD96.2 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 900 lbf XD 950 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4003 N XD 4226 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 4% XD 4%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4% XD 4%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34.4 deg. C)

B. Thermoplastic/Modified Cap (Ply) Sheet:

1. StressPly EUV FR Mineral: 155 mil SBS and SIS (Styrene-Butadiene-Styrene and Styrene-Isoprene-Styrene) rubber modified membrane incorporating post-consumer recycled rubber, fire retardant additives and reinforced with a fiberglass and polyester composite scrim. Surfaced with the highly reflective Sunburst white mineral. ASTM D 6162, Type III Grade G
 - a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 700 lbf/in XD 750 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 122.5 kN/m XD 131.25 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 1300 lbf XD 1400 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 5783 N XD 6227 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 6.0% XD 6.0%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 6.0% XD 6.0%
 - d. Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)
 - e. Reflectivity, ASTM C 1549: 73%

C. Interply Adhesive:

1. Weatherking:Rubberized, polymer modified cold process asphalt roofing bitumen V.O.C. compliant ASTM D 3019. Performance Requirements:
 - a. Non-Volatile Content ASTM D 4479 70%
 - b. Density ASTM D1475 8.9 lbs./gal.
 - c. Viscosity Stormer ASTM D562 400-500 grams
 - d. Flash Point ASTM D 93 100 deg. F min. (37 deg. C)
 - e. Slope: up to 3:12

D. Flashing Base Ply:

1. FlexBase E 80: 80 mil SBS (Styrene-Butadiene-Styrene) rubber modified roofing base

sheet reinforced with a fiberglass and polyester composite scrim, performance requirements according to ASTM D 5147.

- a. Tensile Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 500 lbf/in XD 550 lbf/in
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 87.5 kN/m XD96.2 kN/m
 - b. Tear Strength, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 900 lbf XD 950 lbf
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4003 N XD 4226 N
 - c. Elongation at Maximum Tensile, ASTM D 5147
 - 1) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 4% XD 4%
 - 2) 50 mm/min. @ 23 +/- 2 deg. C MD 4% XD 4%
 - d. Low Temperature Flexibility, ASTM D 5147
 - 1) Passes -30 deg. F (-34.4 deg. C)
- E. Flashing Ply Adhesive:
1. Weathering Flashing Adhesive: Brush grade flashing adhesive.
 - a. Non-Volatile Content ASTM D 4479 70 min.
 - b. Density ASTM D 1475 8.6 lbs./gal. (1kg/l)
 - c. Flash Point ASTM D 93 100 deg. F (37 deg. C)
- F. Surfacing:
1. Flashing Cap (Ply) Sheet:
 - a. StressPly EUV FR Mineral: 155 mil SBS and SIS (Styrene-Butadiene-Styrene and Styrene-Isoprene-Styrene) rubber modified membrane incorporating post-consumer recycled rubber, fire retardant additives and reinforced with a fiberglass and polyester composite scrim. Surfaced with the highly reflective Sunburst white mineral. ASTM D 6162, Type III Grade G
 - 1) Tensile Strength, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 700 lbf/in XD 750 lbf/in
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 122.5 kN/m XD 131.25 kN/m
 - 2) Tear Strength, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 1300 lbf XD 1400 lbf
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 5783 N XD 6227 N
 - 3) Elongation at Maximum Tensile, ASTM D 5147
 - a) 2 in/min. @ 73.4 +/- 3.6 deg. F MD 6.0% XD 6.0%
 - b) 50 mm/min. @ 23 +/- 2 deg. C MD 6.0% XD 6.0%
 - 4) Low Temperature Flexibility, ASTM D 5147, Passes -30 deg. F (-34 deg. C)
 - 5) Reflectivity, ASTM C 1549: 73%

END OF SECTION

SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Manufactured and shop fabricated sheet metal items, including flashings, counter-flashings, and scuppers.
- B. Sealants for joints within sheet metal fabrications.
- C. Reglets and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 54 - Wood Blocking and Curbing: Wood blocking for metal flashings.
- B. Section 07 55 00 – Modified Bituminous Membrane Roofing

1.03 REFERENCE STANDARDS

- A. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2015.
- B. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels; 2013.
- C. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- E. SMACNA - Architectural Sheet Metal Manual; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene at least two weeks before starting work of this Section.

1.05 PERFORMANCE REQUIREMENTS

- A. General: Install flashings that are watertight; will not permit the passage of liquid water; and will withstand wind loads, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system manufacturer based on testing and field experience.

1.06 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details. Key into roof plan shop drawing, see roofing Section.
- C. Samples:
 - 1. Submit samples each 4x4 inch in size, illustrating metal materials, thickness, and colors.
 - 2. Submit samples 8" long in size, illustrating roofing fascia system.

1.07 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.
- B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with ten years of documented experience.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

- B. Prevent contact with materials that could cause discoloration or staining.

1.09 WARRANTY

- A. The flashing and roofing subcontractor hereby guarantees that roof metalwork, flashings, roofing, roof insulation and roof accessories will be free from defective materials and workmanship for a period of two (2) years from the date of Substantial Completion. Upon notification of any such defects within said guarantee period the roofing and flashing subcontractor shall promptly make all necessary repairs and replacements at no cost or expense to the Owner. This warranty shall be signed and countersigned by the installer (Roofer) and the Contractor.
- B. Metal Flashings Warranty under Roofing Manufacturer's Total System Warranty: See Section 07 55 00 – Modified Bituminous Membrane Roofing
- C. Pre-finished Aluminum: Finish shall be warranted against premature failure for twenty years.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Manufactured Membrane Roofing Fascia System: Pre-finished aluminum. ANSI/SPRI ES-1 tested.
 - 1. Products: R-Mer Edge 8" .050 by Garland
 - a. No Substitutions
 - b. The intent of the product specification is to match the existing fascia system profile. The above specification was provided by Garland per the 2008 roof replacement project over portions of the Portsmouth City Hall Buildings. Prior to fabrication of fascia system the Contractor shall verify all existing conditions where new fascia abuts or terminates to or adjacent existing fascia systems noted to remain. Areas where profiles vary shall be brought to the attention of the Architect prior to work for direction.
 - 2. Extruded anchor bar / cleat continuous 6063-T6 alloy aluminum.
 - 3. Fascia: 0.050 inch.
 - 4. Finish: Kynar 500. Color as selected from the manufacturer's full color range.
 - 5. Accessories: As recommended by the system manufacturer.
 - 6. Fasteners: Anchors with rubber washers as recommended by the system manufacturer.
 - 7. Sealant: Non-curing as recommended by the system manufacturer.
- B. Pre-Finished Aluminum: ASTM B209; 0.032 inch thickness or as otherwise indicated; plain finish shop pre-coated with fluoropolymer coating.
 - 1. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; Kynar or Duranar by PPG.
 - 2. Color: As selected by Architect from manufacturer's standard colors.
 - 3. All roof edge metal work shall have been ANSI/SPRI ES-1 tested.
 - 4. For Total System Warranty projects, metalwork shall be as approved by the membrane roofing manufacturer.

2.02 ACCESSORIES

- A. Fasteners: Stainless steel.
- B. Protective Backing Paint: Zinc molybdate alkyd.
- C. Sealant to be Concealed in Completed Work: Non-curing butyl sealant.
- D. Sealant to be Exposed in Completed Work: ASTM C920; elastomeric sealant, 100 percent silicone with minimum movement capability of plus/minus 25 percent and recommended by manufacturer for substrates to be sealed; clear.
- E. Fasteners for Aluminum: Stainless steel ring nails; 12 gage with 1/4" diameter, flat head, annular threaded, needle point, length as required to obtain 1-1/4" embedment into blocking/framing and full depth into plywood.
- F. Anchors for Flashing to Concrete or Masonry: 1/4" diameter, lengths as required to obtain 1-1/2" penetration into masonry backup. Unless otherwise indicated, provide 3 inch edge distance.

1. Product: Nylon Nail-in with stainless steel drive pin manufactured by Powers Fasteners Inc.
- G. Plastic Cement: ASTM D 4586, Type I.

2.03 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.. Form on a bending brake. Perform shaping, trimming, and hand seaming in the shop to the maximum extent possible.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams. Form metal with full regard for expansion and contraction to avoid buckling or other deformation in service. All lines and arrisses shall be straight and crisp except where thickness of metal dictates radius bend.
- E. Immediately prior to soldering, mechanically clean all metal to be soldered with steel wool or other acceptable means, apply flux and pre-tin. Solder shop formed metal joints. Perform all soldering slowly with well heated heavy irons with properly tinned clean blunt tips. Do no use torches. Apply enough heat to sweat the solder completely through the full width of the seam. Close clinch lock seams gently with a block of wood and mallet, then flux and show at least one full inch of continuous and evenly flowed solder. Whenever possible, perform all soldering in flat position. All sloped and vertical seams shall be laced and soldered a second time. After soldering, remove flux. Wipe and wash solder joints clean. Weather seal joints.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Pre-fabricate corners with joints locked, riveted and soldered watertight, and where indicated from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- I. Unless indicated otherwise, provide expansion joints at 24 feet on centers maximum and at 2 feet from all changes in flashing direction (each side) and from all terminations of flashing.
- J. Space rivets 1 inch on center unless indicated otherwise.
- K. Provide backer plates as required at through-wall flashing transitions and corners to fully solder watertight. Backer plates shall be continuous to cover gaps to be overlain by membrane flashing at all deck and column to wall transitions. Secure to framing or plywood at 6" centers and within 1/2" of corners and edges.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION

- A. Install starter and edge strips, and cleats before starting installation.
- B. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
- C. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 GENERAL REQUIREMENTS FOR METAL FLASHING

- A. Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather, without failing. Fabricate and install flashings and roof edges to fully comply with the recommendations of Factory Mutual (FM) Loss Prevention Data Sheet 1-49 for the applicable wind zone.

- B. Schedule and coordinate sheet metal installations with the work of other trades where it is integral or continuous therewith. Materials furnished under this Section that are to be built-in by other trades shall be delivered to the site in sufficient time to avoid delays to construction progress. Instruct other trades concerning the location and placement of reglets, wood nailers, and cleats.
- C. Surfaces to which roofing and sheet metal are to be applied shall be even, smooth, sound, thoroughly clean and dry and free from projecting nail heads or other defects that would affect the application. Report in writing any unsatisfactory surfaces to the Contractor.
- D. Where flashing abuts or members into adjacent dissimilar metals, the juncture shall be executed in a manner that will facilitate drainage and thus minimize the possibility of galvanic action. Note: All metalwork shall be isolated from contact with pressure treated wood products, using roofing membrane, felts, or approved coatings.
- E. All accessories or other items essential to the completeness of the sheet metal installation, though not specifically shown or specified, shall be provided. All such items, unless otherwise indicated on Drawings or specified, shall be of the same kind of material as the item to which applied and the gauges shall conform to recognized industry standards of sheet metal practice.
- F. Provide expansion joints in sheet metal work at intervals not greater than forty (40') feet. Expansion joints shall be fabricated in accordance with the recommendations of the Architectural Sheet Metal Manual (SMACNA) and as specified herein.
 - 1. Begin expansion joint construction by setting an 8" wide cleat. Lapp ends of metal work over base sheet, leaving 1/2" clear space between butt ends. Set ends in full bed of sealant. Cover entire joint assembly with a 4 inch wide metal cover, finish to match other metal work and secured allowing for movement.
- G. Fabricate and install sheet metal with lines, arises, and angles sharp and true and plane surfaces free from objectionable wave, warp, or buckle. Exposed edges of sheet metal shall be folded back to form a 1/2" wide hem on the side concealed from water leakage under all weather conditions. The workmanship and methods employed for framing, anchoring, cleating, and the expansion and contraction of sheet metal work shall conform to applicable details and description as indicated in current edition of the following publications unless other methods are indicated on project Drawings or specified herein.
 - 1. Architectural Sheet Metal Manual as published by the Sheet Metal and Air Conditioning Contractors National Association, Inc., and hereinafter referred to as "The SMACNA Manual".
 - 2. Handbook of Sheet Copper Fundamentals, Design, Details and Specifications as published by Copper Development Association, Inc., latest Edition.
- H. All ferrous metal work shall be zinc coated and finished as specified elsewhere herein. Touch-up all field cuts and minor scratches with approved zinc rich primer and finish coat to match adjacent finishes.
- I. All metal work terminating on roofing shall be provided with flanges for nailing. Wood nailers shall be provided beneath flanges and roofing for nailing of the metal flanges.
- J. Provide cleats, edge and drip strips where sheet metal extends over edges and where necessary to secure sheet metal work at fascias and elsewhere. Form edge strips in lengths of 8' or 10'. The ends shall be butted together, leaving approximately 1/4" space for expansion. Secure to building construction with fasteners spaced not over 12" on centers. Install strips in continuous, long lengths to allow metal work to be hooked over lower edge at least 1/2".
- K. Flash intersections of roofs with vertical surfaces as detailed and indicated on the Drawings, or otherwise required to provide watertight construction and to suit job conditions.
- L. Seams shall always be made in direction of flow.
- M. Fabricated fascias shall be sized and shaped to profiles indicated, using sheets 8' to 10' long. Lower edge shall hook a minimum of 1/2" over previously placed continuous edge cleats.

3.04 INSTALLATION

- A. Conform to drawing details. Installations shall conform to SMACNA Architectural Sheet Metal Manual recommendations and National Roofing Association Manual recommendations.
- B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
- C. Apply plastic cement compound between metal flashings and felt flashings.
- D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

3.05 INSTALLATION OF TOTAL SYSTEM ROOFING METALWORK

- A. Confirm that roofing membrane shall extend over face of perimeter blocking and weather barrier transition membrane for wall / eave construction.
- B. Set anchor cleat in a continuous bead of sealant and secure with recommended fasteners.
- C. At end joints and corners of anchor cleat, install manufacturer's rubber splice material to maintain a continuous seal providing a watertight edge.
- D. Install fascia on the anchor cleat in accordance with manufacturer's recommendations.

3.06 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for field inspection requirements.
- B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.
- C. See Section 07 53 00 - Elastomeric Membrane Roofing, for field inspection requirements.

3.07 SCHEDULE

- A. Fascia: Aluminum:.040
- B. Cleats: Aluminum:.050
- C. Scuppers: Aluminum:.050
- D. Coping, Cap, Parapet, Sill and Ledge Flashings: Aluminum: .040
- E. Miscellaneous Flashings: Aluminum:.040 or as required, unless otherwise indicated on Drawings.

3.08 CLEANING AND PROTECTION

- A. Clean all metalwork to remove all fingerprints, oils, etc.
- B. Remove from roof surfaces all scraps and metal debris immediately. Extreme care shall be exercised to prevent sharp metal scraps or waste nails from coming into contact with membrane materials.

END OF SECTION

SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems for all penetrations and interruptions to fire-rated assemblies, smoke barriers, non-fire rated floor assemblies, whether indicated on drawings or not, and other openings indicated. See the Drawings for assembly fire ratings.
- B. Identification signage.

1.02 RELATED REQUIREMENTS

- A. Section 07 21 00 - Insulation: Fiber Firestopping Insulation.
- B. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing and deflection head track types.
- C. Division 21 - Fire Protection: Firestopping of fire protection work.
- D. Division 22 - Plumbing: Firestopping of plumbing work.
- E. Division 23 - HVAC: Firestopping of heating, ventilating and air conditioning work.
- F. Division 26 - Electrical: Firestopping of electrical work.
- G. Division 27 – Communications: Firestopping of communications work.

1.03 REFERENCE STANDARDS

- A. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2014.
- B. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a.
- C. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2011.
- D. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2015a.
- E. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2013.
- F. ITS - Directory of Listed Products; current edition.
- G. FM P7825 - Approval Guide; current edition.
- H. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; 2004.
- I. UL - Fire Resistance Directory; current edition.

1.04 DEFINITIONS

- A. Annular Space is the opening around an item (pipe, duct, etc.) penetrating a construction assembly.
- B. Fire-resistance is the property of materials or their assemblies that prevents or retards the passage of excessive heat, hot gases, or flames under conditions of use.
- C. Fire-resistive joint system is the assemblage of specific materials or products that are designed, tested and fire-resistance rated in accordance with ASTM E119 to resist for a prescribed period of time the spread of fire through joints in or between fire-resistance rated assemblies.
- D. Firestopping is a specific assembly of materials or products fill openings and annular spaces around penetrating items (such as cables, cable trays, conduits, ducts, pipes) and their means of support through the wall, floor, ceiling or roof to prevent spread of fire and includes fire-resistive joint systems and through-penetration firestop systems.

- E. Through-penetration is an opening that passes entirely through a fire-resistance rated assembly.
- F. Through-penetration firestop system is a specific assembly of materials that are designed, tested and installed to prevent the spread of fire through openings in fire-resistive rated floors and walls to accommodate through-penetrations of electrical, mechanical, plumbing, and communications systems.
- G. "F" rating indicates the period of time that the through-penetration firestop system is capable of preventing the passage of flame to the unexposed (non-fire) side of the assembly in conjunction with an acceptable hose stream test performance.
- H. "T" rating indicates the period of time that the through-penetration firestop system is capable of preventing the passage of flame and temperature rise of 325 degrees F. above ambient temperature on the unexposed (non-fire) side of the assembly in conjunction with an acceptable hose stream test performance.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance ratings, and limitations. A coordinated submittal shall be prepared for all firestopping used on the Project.
- C. Shop Drawings: Submit manufacturer's illustrated test assembly shop drawings detailing materials, installation methods, and relationships to adjoining construction for each through-penetration firestop system and fire-resistant joint system, each construction condition and type of penetration or joint. Include firestop design designation from the approved testing agency (UL, for example).
 - 1. For those firestop applications for which no tested system is available from the manufacturer, the manufacturer's engineering judgment derived from similar tested system designs or other tests shall be submitted to the Authority Having Jurisdiction for their review and approval prior to installation.
 - 2. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
 - 3. One firestopping submittal shall cover products used for all phases of multi-phase projects.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- E. Installer Qualifications: Submit qualification statements for installing mechanics.

1.06 QUALITY ASSURANCE

- A. Single Source: If the Contractor determines that individual trades (i.e. mechanical, plumbing, fire protection, electrical) shall be responsible for firestopping their penetrations, instead of all firestopping provided by a single contractor, products used shall be coordinated among the various trades by the Contractor so that multiple products or manufacturers are NOT used for the same type of application.
 - 1. The Contractor shall provide a coordinated submittal for all firestopping used on the Project.
- B. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
 - 1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
 - 3. For those firestop applications that exist for which no approved tested system is available through a manufacturer, an engineered judgment derived from similar system designs or other approved tests shall be submitted to the local Authority Having Jurisdiction for review and approval prior to installation. Engineering judgment drawings shall follow requirements set forth by the International Firestop Council.

- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum ten years documented experience.
- D. Installer Qualifications: Company or personnel specializing in performing the work of this Section, trained by the firestop manufacturer(s) and with a minimum of 3 years documented experience installing work of this type. Submit written qualifications statements for installing mechanics.

1.07 MOCK-UP

- A. Install one firestopping assembly representative of each fire rating design required on Project.
 - 1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
 - 2. Where firestopping is intended to fill a linear opening, install minimum of 1 linear ft.
- B. Obtain approval of authority having jurisdiction and testing agency before proceeding.
- C. Remove and replace unsatisfactory mock-ups. Accepted mock-ups shall represent minimum standards for the Work.
- D. Accepted mock-ups may remain as part of the Work.

1.08 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 FIRESTOPPING GENERAL REQUIREMENTS

- A. Firestopping: All products shall be by one of the following acceptable manufacturers and shall be specific for each construction condition, fire-resistance requirement, and annular size. Multiple products shall not be used for the same application. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.
- B. Basis of Design: Hilti Inc.
- C. Acceptable Manufacturers:
 - 1. 3M Fire Protection Products.
 - 2. Tremco.
 - 3. AD Fire Protection Systems, Inc.
 - 4. Nelson FireStop Products.
 - 5. Specified Technologies, Inc.
 - 6. BioShield.
 - 7. Metacaulk - RectorSeal Corp
 - 8. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.
- E. Fire Ratings: See Drawings for required systems and ratings.

2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Provide firestop systems manufactured and installed to resist spread of fire, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated for:
 - 1. Fire rated load-bearing walls and non-load bearing partitions.
 - 2. Fire rated floor assemblies and roof assemblies
 - 3. Fire rated smoke barriers.

- B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa). Fire-resistance-rated walls include fire walls and fire-barrier walls.
 - 1. F-Ratings as determined by ASTM E814, but not less than that equaling or exceeding fire resistance rating of the construction penetrated.
- C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. Horizontal assemblies include floors, floor/ceiling assemblies, and ceiling membranes of roof/ceiling assemblies.
 - 2. F-Rating: At least 2 hour, but not less than the fire-resistance rating of constructions penetrated.
 - 3. T-Rating: At least 2 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 4. Provide firestop systems with T-ratings in addition to F-ratings as determined by ASTM E814, where systems protect penetrations located outside wall cavities, located outside fire-resistive shaft enclosures, located in construction containing fire protection rated openings and at penetrating items larger than 4 inches in diameter pipe or 16 sq inches cross sectional area.
- D. For firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
 - 1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant firestop systems.
 - 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 - 3. For penetrations involving insulated piping, provide firestop systems not requiring removal of insulation.
 - 4. For firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed.
- E. Provide firestop systems that are compatible with one another and the substrates they are in contact with based on testing and field experience.
- F. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the VOC limit contents per 40 CFR 59, Subpart D (EPA Method 24):
 - 1. Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- G. W-Rating: Provide penetration firestopping showing no evidence of water leakage when tested according to UL 1479.
- H. Mold Resistance: Provide firestopping materials with mold and mildew resistance rating of 0 as determined by ASTM G21.
- I. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
 - 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
 - a. Coordinate with Section 09 21 16 - Gypsum Board Assemblies for deflection head tracks at fire-rated assemblies with greater than 1/2 inch of movement.

2.03 OTHER MATERIALS

- A. Accessories: Provide components for each firestop system that are needed to install fill materials and to comply with performance requirements. Use only components specified by

firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:

1. Permanent forming/damming/backing materials, including the following:
 - a. Slag-/rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - e. Substrate primers.
 - f. Collars.
 - g. Steel sleeves
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrating item.
- E. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags.
- I. Silicone Foam: Multi-component, silicone-based liquid elastomer that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants, pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping, gunnable sealant, unless indicated firestop system limits use to non-sag grade for both opening conditions.
- K. Caulking Compound (fire sealant): Material approved by the safing insulation manufacturer for sealing joints between foil backing of safing insulation and edge of concrete floor slab against smoke penetration.
- L. Safing Clips: Galvanized steel safing clips approved by the safing insulation manufacturer for holding insulation in place.
- M. Sleeves for through-penetrations shall be of non-combustible materials and securely fastened to the assembly penetrated. Sleeves through floors in exposed locations, behind kitchen cooking line equipment for piping and conduit, for example, shall extend 1" above the floor surface to stop water seepage to floor below.
- N. Identification Signage: Pressure sensitive self-adhesive, preprinted vinyl labels; including the following information on labels:
 1. "Warning - Through Penetration Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, phone number.
 3. Firestop system designation of applicable testing and inspecting agency (UL or WH).
 4. Date of installation.
 5. Firestop system manufacturer's name.

6. Installer's name.
- O. Primers: Type required for tested assembly design.
- P. Fiber Firestopping Insulation (Safing Insulation): Mineral fiber batt, unfaced insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening; conforming to ASTM C 665 Type 1.
 1. Density, ASTM D 1622: 4 lb/cu ft min.
 2. Max. Water Absorption, ASTM C 272: 0.1% by volume.
 3. Durability and Longevity: Permanent.
 4. Fire Resistance, ASTM E84: Flame spread: 15; Smoke Developed: 0.
 5. Manufacturer's "Z" impaling clips as required
 6. Product for Curtainwalls: Foil faced Thermafiber Curtainwall Insulation by USG.
 7. Products:
 - a. Thermafiber by United States Gypsum Co.
 - b. Safing Insulation / MW by Owens Corning Insulation.
 - c. FBX Safing Insulation by Fibrex Insulations, Inc.
 - d. Safe by Roxul Inc.

2.04 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.
 1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
 2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.

2.05 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

- A. Concrete and Concrete Masonry Walls and Floors:
 1. Floor to Floor Joints:
 - a. 2 Hour Construction: UL System FF-D-1013; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
- B. Gypsum Board Walls:
 1. Wall to Wall Joints:
 - a. 2 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
 - b. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
 2. Top of Wall Joints at Concrete Over Metal Deck, Wall Parallel to Ribs:
 - a. 2 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 1 Hour Construction: UL System HW-D-0049; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 3. Top of Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Cut to Fit Ribs:
 - a. 2 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
 - b. 1 Hour Construction: UL System HW-D-0045; Hilti CP 606 Flexible Firestop Sealant.
 4. Top of Wall Joints at Concrete Over Metal Deck, Wall Perpendicular to Ribs, Not Cut to Fit:
 - a. 2 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
 - b. 1 Hour Construction: UL System HW-D-0042; Hilti CFS-SP WB Firestop Joint Spray and CP 672.

2.06 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

- A. Blank Openings:
 1. In Floors or Walls:

- a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- B. Penetrations Through Floors or Walls By:
 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-1421; Hilti FS-ONE MAX Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant.
 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System C-AJ-2567; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
 4. Cable Trays with Electrical Cables:
 - a. 2 Hour Construction: UL System C-AJ-4094; Hilti CFS-BL Firestop Block.
 5. Insulated Pipes:
 - a. 2 Hour Construction: UL System C-AJ-5091; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
 6. HVAC Ducts, Uninsulated:
 - a. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System C-AJ-7084; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
- C. Penetrations Through Floors By:
 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System F-A-8012; Hilti CFS-S SIL GG Firestop Silicone Sealant Gun-Grade or CFS-S SIL SL Firestop Silicone Sealant Self-Leveling.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System F-A-1016; Hilti CP 680-P/M Cast-In Device.
- D. Penetrations Through Walls By:
 1. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-J-1067; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 2. Insulated Pipes:
 - a. 2 Hour Construction: UL System W-J-5041; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-J-5041; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 3. HVAC Ducts, Uninsulated:
 - a. 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE MAX Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
 4. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE MAX Intumescent Firestop Sealant.

2.07 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

- A. Blank Openings:
 1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.

2. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
- B. Penetrations By:
 1. Multiple Penetrations in Large Openings:
 - a. 2 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-8071; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 2 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - d. 2 Hour Construction: UL System W-L-8013; Hilti CFS-BL Firestop Block.
 - e. 1 Hour Construction: UL System W-L-1408; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - f. 1 Hour Construction: UL System W-L-8071; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - g. 1 Hour Construction: UL System W-L-8079; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 2. Uninsulated Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-1054; Hilti FS-ONE MAX Intumescent Firestop Sealant. MAX
 - d. 1 Hour Construction: UL System W-L-1164; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
 - a. 2 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
 - b. 2 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
 - d. 1 Hour Construction: UL System W-L-2128; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 4. Electrical Cables Not In Conduit:
 - a. 2 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
 - b. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 - c. 1 Hour Construction: UL System W-L-3065; Hilti FS-ONE MAX Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
 - d. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
 5. Cable Trays with Electrical Cables:
 - a. 2 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.
 - b. 2 Hour Construction: UL System W-L-4060; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - c. 1 Hour Construction: UL System W-L-4011; Hilti CFS-BL Firestop Block.
 - d. 1 Hour Construction: UL System W-L-4060; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 6. Insulated Pipes:
 - a. 2 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 2 Hour Construction: UL System W-L-5029; Hilti FS-ONE MAX Intumescent Firestop Sealant.

- c. 1 Hour Construction: UL System W-L-5028; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- d. 1 Hour Construction: UL System W-L-5029; Hilti FS-ONE MAX Intumescent Firestop Sealant.
- 7. HVAC Ducts, Insulated:
 - a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.
 - b. 1 Hour Construction: UL System W-L-7156; Hilti FS-ONE MAX Intumescent Firestop Sealant.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this Section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Coordinate with mechanical, fire protection, electrical, and other trades to assure that all pipes, conduits, cable trays, cables, ducts, and other items that penetrate fire-resistant construction are properly firestopped.
- C. Install dams where recommended or required by tested fire-resistive joint assemblies and through-penetration firestop systems. Combustible damming material and other accessories not indicated as permanent components of firestop systems shall be removed after appropriate curing.
- D. Install firestopping materials in conjunction with fiber firestopping insulation (firesafing insulation) as required by tested assemblies.
- E. Where cable trays penetrate fire-resistant wall assemblies, provide pillow type firestop product. All cabling /wiring sleeves whether empty or utilized for wiring through fire-resistant assemblies shall be firestopped.
- F. Do not cover installed firestopping until inspected by Authority Having Jurisdiction and/or testing agency.
- G. In general, for fire containment at perimeter curtainwall systems, firesafing insulation shall be mechanically attached to curtainwall mullions and transoms using impaling pins, screws or other positive mechanical attachment as required. Install in strict accordance with the manufacturer's tested assemblies and recommendations. Firesafing insulation shall be compression fit into the floor line void between floor structure and curtainwall firesafing, supported with "Z" clips. Coordinate with the work of Section 07 84 00 - Firestopping
 - 1. Install a light gage steel angle or channel continuously behind the insulation and attached to the vertical mullions at the floor firesafing line to prevent bowing of the curtainwall insulation due to compression of the firesafing insulation at the floor line. Exposed curtainwall mullions shall be protected with firesafing mullion covers.
 - 2. Install insulation between aluminum framing members and other surfaces with insulation fitting snugly to prevent settling. All voids and gaps shall be completely filled.
 - 3. Firestopping shall be installed on the floor line firesafing insulation. Installations shall be in accordance with UL tested assemblies.

3.04 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.05 IDENTIFICATION

- A. Identify all firestop system locations with pressure sensitive self-adhesive, pre-printed vinyl labels.
 - 1. Attach labels permanently to both sides of penetrated construction surfaces and joints in fire-rated construction.
 - 2. Labels shall be visible to anyone seeking to disturb or remove penetrating items or firestop system. Where possible, labels shall be installed above finished ceilings. Where installed in exposed locations, labels shall be neatly located.
 - 3. Labels for horizontal joints shall be installed at a maximum spacing of ten (10) feet.

3.06 FIELD QUALITY CONTROL

- A. Prepare and install firestopping systems in accordance with manufacturer's shop drawings, tested assemblies and instructions
 - 1. Follow safety procedures recommended in Material Safety Data Sheets.
 - 2. Finish all firestopping surfaces that are to remain exposed in the completed Work to a uniform and level condition.
- B. Firestopping materials and installations at joints and penetrations in fire-resistive rated assemblies and smoke barrier assemblies shall not be concealed from view until inspected and approved by the Authority Having Jurisdiction or, if designated, by the Owner's testing agency. Such inspection shall include partial destructive inspection to determine compliance with tested firestop assembly requirements. All such locations shall be repaired or replaced by the Contractor at no additional cost to the Owner.
 - 1. All firestopping locations shall be visually inspected.
 - 2. At a minimum, not less than 5% of all firestopping joints and penetrations shall be inspected by removal of materials to determine conformance to assembly requirements.
- C. Inspections by the AHJ and /or the testing agency shall not relieve the Contractor of responsibility for providing his own inspections and quality control in compliance with specified requirements.
- D. Inspections shall be performed as required by the building code, the Construction Documents or as otherwise directed by the Architect.
- E. The Contractor shall cooperate with individuals conducting such inspections. The Contractor shall notify inspectors at least five (5) days in advance of requested inspection date. All identification labeling, firestopping and smoke sealing work shall be completed prior to inspection.
- F. Any non-compliant materials shall be removed and replaced. Any locations missing required protection shall be corrected by the Contractor and re-inspected prior to concealing such areas with other construction. Any material or workmanship that is rejected shall be corrected and /or replaced promptly by the Contractor to the satisfaction of the inspector and/or Architect, and at no additional cost to the Owner.

3.07 PROTECTION

- A. Clean adjacent surfaces of firestopping materials. Leave work in a neat and clean condition.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION

SECTION 07 90 05
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.
- B. Compressible fillers.

1.02 RELATED REQUIREMENTS

- A. Section 07 21 00 - Thermal Insulation: Firestop insulation.
- B. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
- C. Section 07 84 00 - Firestopping: Firestopping sealants.
- D. Section 08 80 00 - Glazing: Glazing sealants and accessories.
- E. Section 09 21 16 - Gypsum Board Assemblies: Acoustic construction.
- F. Section 09 30 00 - Tiling: Sealant used as tile grout.

1.03 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2012.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.
- E. SCAQMD 1168 - South Coast Air Quality Management District Rule No.1168; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with other Sections referencing this Section.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics.
- C. Samples: Submit samples 2 inch in size illustrating sealant colors for selection.
- D. Manufacturer's Installation Instructions: Indicate special procedures.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this Section with minimum twenty five years documented experience.
- C. Applicator Qualifications: Company specializing in performing the work of this Section with minimum five years of experience. Where applicable, applicators shall be approved by their respective material manufacturers as licensed applicators. All applicators shall be skilled personnel who are thoroughly trained and experienced in the necessary skills, completely familiar with the specific requirements of the Work.

1.07 MOCK-UPS AND SAMPLE INSTALLATIONS

- A. Mock-Ups: Provide sealants for exterior wall mock-ups specified in Section 04 20 00.
 - 1. Mock-up panels shall demonstrate actual wall construction, detailing and workmanship.
 - 2. No work shall progress until the Architect has reviewed the mock-up panels. Panels shall be revised as necessary to secure the Architect's acceptance and shall then become the standard of comparison for all related exterior wall work.

3. Mock-up panels shall not be destroyed or moved until the Work is complete and accepted by the Architect. Upon completion of construction, mock-up panel) shall be removed.
- B. Sample Installations:
1. Provide sealant joints in conjunction with sample window installations.
 2. Provide sample exterior sealant installation at brick masonry. No work shall progress until the Architect has reviewed the sample installation. Make revisions as necessary to secure the Architect's acceptance and shall then become the standard of comparison for all related exterior wall work.
 - a. Locate where directed.
 - b. Accepted sample installations may remain as part of the Work.

1.08 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- B. Do not proceed with application of materials when surface or air temperatures are less than 40 degrees F or likely to drop to below 40 degrees F in the following 24 hours after sealant installation.
- C. Do not apply materials unless surface to receive coating is clean and dry, or if precipitation is imminent.
- D. Coordination: It shall be the responsibility of the Contractor to properly coordinate the Work of this Section with that of all other trades in order to ensure the providing of complete and continuous sealing and consistent use of products specified herein.

1.09 WARRANTY

- A. See Section 01 78 10 - Warranties, for additional warranty requirements.
- B. Warranty:
 1. Include coverage for installed sealants and accessories which fail to achieve airtight seal and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.
 - a. Urethane Sealants: Five years.
 - b. Silicone Sealants: Twenty years, unless otherwise indicated with product description.
 2. Provide manufacturer's non-stain warranty.
- C. The installer shall provide an installation warranty that all Sealing shall be free of defects of materials and workmanship for two (2) years; and shall repair and/or replace such defective work, during the warranty term, without extra cost to the Owner.
 1. The following types of sealing failures will be considered defective Work: Leakage, loosening, loss of bond, hardening, cracking, crumbling, melting, shrinking, running, sagging, improper tooling, discoloration, or staining of adjacent work.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gunnable and Pourable Sealants:
 1. Dow Corning.
 2. Pecora Cop.
 3. Tremco Global Sealants.
 4. Substitutions: See Section 01 60 00 – Product Requirements.

2.02 SEALANTS

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
 1. Sealant Types:
 - a. M - Multi-component.
 - b. S- Single component.
 - c. P - Pourable or self-leveling for traffic joints

- d. NS - Non-sage or gunnable for vertical and non-traffic joints.
- e. FC - Fast cure.
2. Sealant Classes:
 - a. 25, 50 and 100/50 (extension/compression) represent movement capability in percent of joint width.
3. Sealant Uses:
 - a. T - Traffic
 - b. NT - Non-Traffic
 - c. I - Immersion
 - d. M - Mortar
 - e. A - Aluminum
 - f. O - Other (includes steel, painted surfaces, wood, brick, stone, tile)
- B. General Purpose Exterior Sealant: Silicone, ASTM C920, Grade NS, Class 100/50, Uses T, NT, A, G, M, O; single component, neutral curing, non-sagging, non-staining, non-bleeding, ultra-low-modulus.
 1. Color: To be selected by Architect from manufacturer's standard range.
 2. Shore A Hardness Range: 15.
 3. Applications: High movement joints.
 - a. Joints between concrete and other materials.
 - b. Joints between metal frames and other materials.
 - c. Joints between dissimilar materials and building construction.
 - d. Control, expansion, and soft joints in stone, masonry, pre-cast concrete.
 4. Joint size: 1/4" min to 3" max width and 1/4" min to 1/2" max depth.
 5. Note: Compatibility with materials sealant shall be in contact with shall be verified prior to use.
 6. Limitations: Not for use in structural applications, below grade or to materials that outgas, on brass, copper, or materials that can corrode, at joints continuously immersed in water, interior firestop sealing, at materials that bleed oils, plasticizers, or solvents, in confined spaces, to surfaces that will be painted, to surfaces in contact with food, to wet surfaces, to architectural finishes without prior testing, and as otherwise limited by the manufacturer.
 7. Basis of Design: 756 by Dow Corning Corp.
- C. Interior Sealant: Polyurethane; ASTM C920, Grade NS, Class 50, Uses T, NT, I, M, O, and A; chemically curing, multi- component, low modulus.
 1. Color: Multiple colors selected from manufacturer's standard range.
 2. Movement Capability: Plus 50 percent, minus 50 percent.
 3. Shore A Hardness Range: 25-35.
 4. Interior Applications:
 - a. Smoke and acoustic sealant at high movement joints.
 5. Joint size: Up to 3.5 ". Note at top of partition conditions, mineral fiber insulation is backer.
 6. Note: Compatibility with materials sealant shall be in contact with shall be verified prior to use.
 7. Product: Spectrem 1 by Tremco Inc.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
 1. Applications: For minimal movement.
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces, where minimal movement is expected and will receive field painting.
 - c. Interior sound sealing, non-fire rated smoke sealing where little movement is anticipated.
 - d. Other interior joints for which no other type of sealant is indicated.
 2. Note: Compatibility with materials sealant shall be in contact with shall be verified prior to use.

3. Limitations: Not for use at joints subject to dynamic movement, submerged in water, and as otherwise limited by the manufacturer.
4. Products:
 - a. Acrylic Latex 834 by Tremco Inc.
 - b. AC-20 + Silicone Acrylic Latex Caulking Compound by Pecora Corp.

2.02 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing (Exterior): Closed-cell polyethylene, non-bleeding neoprene or butyl rod, diameter approximately 30% greater than width of the joint, as recommended by the sealant manufacturer.
- D. Joint Backing (Interior): Open-cell polyurethane foam rod, diameter approximately 30% greater than width of the joint, as recommended by the sealant manufacturer.
- E. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- F. Compressible Filler: Compressible, open-cell polyurethane foam saturated with stabilizing acrylics, with a waterproof sealing compound/release agent. Size appropriately to fill void geometry, as recommended by the sealant manufacturer.
 1. Products - general:
 - a. Polytite Standard by Polytite Manufacturing Corp.
 - b. Grayflex by Emseal Joint Systems Ltd., or as recommended by the sealant manufacturer.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.
 2. Products - for secondary seal to sealant with joint backing:
 - a. Polytite B by Polytite Manufacturing Corp.
 - b. Backerseal by Emseal Joint Systems Ltd., or as recommended by the sealant manufacturer.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify the Contractor of conditions detrimental to the proper and timely completion of the Work. Do not proceed until unsatisfactory conditions have been corrected by the Contractor to meet acceptable industry standards in a manner acceptable to the Architect.
- C. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement. Mask off adjoining surfaces as needed to prevent surface damage.

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. Perform acoustical sealant application work in accordance with ASTM C919.

- D. Sealing at Acoustical Construction: At construction designated "Acoustical Construction" seal around all joints and pipe, conduit, structural member, duct, and electrical box openings to gypsum wallboard or masonry as applicable. Seal bottom of gypsum wallboard partitions to floor slabs. Seal tops of masonry and gypsum wallboard partitions to decks (including voids at fluted decks), and seal sides of partitions to abutting construction. Note: Sealing related to installation of partition framing members and gypsum wallboard is specified under Section 09 21 16 - Gypsum Board Assemblies.
- E. Non-Fire Rated Smoke Sealing: At building assemblies identified as non-fire rated smoke barriers, seal all joints and pipe, conduit, structural member, duct and electrical box openings. Openings above finish ceilings or other concealed locations may be sealed on one side only. All openings and annular spaces shall be backed with fire safing insulation prior to installation of sealant.
- F. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- G. Do not leave gaps between ends of joint backers. Do not twist, stretch or tear backers.
- H. Install bond breaker where joint backing is not used. Back rods shall be 25% wider than the joint width.
- I. Application of Sealant: Sealant shall be gun-applied through a nozzle opening of such diameter so that the full bead of sealant is gunned into the joint, filling the joint completely. A superficial or skin bead will not be acceptable.
 - 1. Sealant geometry (depth to width ratios) shall be as recommended by the manufacturer for each specific application.
 - 2. Beads shall be tooled immediately after application to ensure firm, full contact with the inner faces of the joint. Excess material shall be struck off with a tooling stick or knife.
 - 3. The finished bead shall be smooth, properly contoured and flush with the adjacent surface, or as otherwise indicated.
 - 4. Remove all excess materials and smears adjacent to the joint as work progresses. All materials shall be used in accordance with the manufacturer's printed instructions.
- J. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- K. Apply sealant when joint is cool to minimize chances of delamination and wrinkles.
- L. Tool joints concave.
- M. Fillers: Avoid joints except at ends, corners, and intersections; seal all joints with adhesive; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 FIELD QUALITY CONTROL

- A. Perform stain tests in accord with manufacturer's instructions and ASTM C1248 on mock-up joints prior to start of job installation.
- B. Perform adhesion tests in accord with manufacturer's instructions and ASTM C1193, Method A, Field Applied Sealant Joints Hand Pull Test.
 - 1. Perform tests on mock-up joints prior to start of job installation.
 - 2. Perform a minimum of 1 test for every 200 linear feet of applied sealant and one (1) test per floor per building elevation minimum.
 - 3. For sealant applied to dissimilar materials, test both sides of the joint.
- C. Sealant failing test shall be removed, surfaces cleaned, resealed and retested.
- D. Maintain a test log and submit report to the Architect indicating tests, locations, dates, results and remedial action.

3.05 CLEANING AND PROTECTION

- A. Clean adjacent soiled surfaces. Protect sealants until cured.

END OF SECTION

SECTION 07 95 13
EXPANSION JOINT COVER ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Expansion joint cover assemblies for wall, ceiling, and soffit surfaces.

1.02 RELATED REQUIREMENTS

- B. Section 07 55 00 – Modified Bituminous Membrane Roofing: Roof expansion joints.
- C. Section 09 21 16 - GYPSUM BOARD ASSEMBLIES: Gypsum board control joint trim.
- D. Section 09 51 00 - Acoustical Ceilings: Ceiling grid expansion devices.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, effected adjacent construction and anchorage locations.
- D. Samples: Submit two samples 6 inch long, illustrating profile, dimension, color, and finish selected.
- E. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.

PART 2 PRODUCTS

2.01 EXPANSION JOINT COVER ASSEMBLIES

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
 - 1. Joint Dimensions and Configurations: As indicated on drawings.
 - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
 - 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
- B. Covers In Fire Rated Assemblies: Provide cover assembly having fire rating equivalent to that of assembly into which it is installed.
 - 1. Acceptable Evaluation Agencies: UL, ULC, and Intertek.
- C. General: Refer to the Drawings and Code Analysis Plans for fire-rating hourly requirements at expansion joint assemblies. See Section 07 84 00 - Firestopping.
 - 1. Finishes: Colors as selected by the Architect from manufacturer's full range.

2.02 MATERIALS

- A. Anchors, Fasteners and Accessories: As recommended by cover manufacturer.
- B. Type 1 - Interior Walls:
 - 1. Product for non-rated locations: Seismic Colorseal by Emseal.
 - 2. Product for fire-rated locations: WFR2 by Emseal.
 - 3. Where indicated on the Drawings, seal at back-up construction with compressible filler.
 - 4. Finish: Color as selected by the Architect from manufacturer's full range.
- C. Type 2 - Ceiling ACT to Wall: 2" joint for 1" movement. See Section 09 51 00.

2.03 FABRICATION

- A. Provide joint components in single length wherever practical. Minimize site splicing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

3.02 INSTALLATION

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.

3.03 PROTECTION

- A. Provide strippable coating to protect finish surface.

END OF SECTION

SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel doors and frames.
- B. Steel frames for wood doors.

1.02 RELATED REQUIREMENTS

- A. Section 08 14 16 - Flush Wood Doors.
- B. Section 08 71 00 - Door Hardware.
- C. Section 09 90 00 - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council; 2009.
- C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- E. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- F. ASTM A1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.
- G. ASTM A1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2014.
- H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2014 (ANSI/BHMA A156.115).
- I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2009.
- J. ITS - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- K. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.
- L. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- M. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2013.
- N. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.
- O. UL - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- P. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- Q. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- R. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.
- S. SDI 117: Manufacturing Tolerances for Standard Steel Doors and Frames.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, cores, sound ratings, profiles, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, fire-ratings, glazing, frame profiles, anchors, and identifying location of different finishes, if any.
- D. Samples: Submit samples of typical frame, door section, glazing frame and loose stop, upon request.
- E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum ten years documented experience.
- B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840. Store all materials upright, in a protected dry area, at least 1" or more off the ground or floor and at least 1/4" between individual pieces. Materials shall not be permitted to rust or corrode.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Steel Doors and Frames:
 - 1. Ceco.
 - 2. Republic Doors
 - 3. Steelcraft.
 - 4. Curries Door Co.
 - 5. Pioneer.
 - 6. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Metallic-Coated Steel Sheet: ASTM A653, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
- C. Frame Anchors: ASTM A653, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180 or A60 (ZF180) metallic coating.

2.03 DESIGN CRITERIA

- A. Requirements for Hollow Metal Doors and Frames:
 - 1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653, cold-rolled steel conforming to ASTM A1008, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011, Commercial Steel (CS) Type B for each.
 - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
 - 3. Door Top Closures: Welded, flush with top of faces and edges.

4. Door Edge Profile: Manufacturers standard for application indicated.
 5. Typical Door Face Sheets: Flush.
 6. Hardware Preparation: In accordance with DHI A115 Series, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
 7. Galvanizing for Units in Wet Areas: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653, with manufacturer's standard coating thickness
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.
- C. Fire-Rated Door Assemblies:
1. All fire-rated doors and frames shall conform to and/or be tested by the requirements of:
 - a. UL 10C - Pressure Fire Test of Door Assemblies.
 - b. NFPA 252 - Methods of Fire Tests of Door Assemblies.
 - 1) After 5 minutes in the test, the neutral pressure level in furnace shall be established at 40 inches or less above the sill.
 - c. NFPA 80 - Standard for Fire Doors and Other Opening Protectives.
 - d. NFPA 101 - Life Safety Code, 2009.
 - e. International Building Code, 2009.
 - f. NFPA 105 - Standard for Installation of Smoke and Draft Control Assemblies.
 - g. ASTM E119 - Standard Method for Testing Construction Assemblies.
 - h. UL 1784: Smoke and draft control air leakage not to exceed 3.0 cu ft / min / sq ft of door opening at 0.10 inch of water for ambient and elevated temperature tests.
 2. All components of a fire-rated assembly (door, locks, closers, latches, hinges, frames, etc.) shall be rated at or exceed the intended fire protection rating indicated for the assembly.
 3. Fire-rated doors and door frames shall be labeled in accordance with NFPA 80; permanently labeled and listed by UL, Intertek or Warnock Hersey.
 - a. Oversize fire-rated door assemblies: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, provide a certificate and label from an approved independent testing and inspection agency, indicating that the door and frame assembly conforms to the requirements of design, materials, and construction as established by individual listings for tested assemblies.
 - b. If any door or frame specified by the Architect to be fire-rated cannot qualify for appropriate labeling because of its design, hardware or any other reason, the Architect shall be so advised before proceeding with fabrication.
- D. Fire-Ratings for Door and Door Frame Assemblies: As indicated on Door and Frame Schedule on the Drawings.

2.04 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. General:
1. Doors shall be strong, rigid and neat in appearance, free of warpage or buckle. Corner bends shall be true, straight, and of minimum radius for the gauge of metal specified.
 2. Door faces shall be joined at their vertical edges by continuously welding the faces to the internal stiles extending the full height of the doors. Welds shall be ground and dressed to make them invisible, providing a smooth finish surface.
 3. Tops and bottoms of the doors shall have an inverted channel made of 18-gauge galvanized steel; spot-welded five (5") inches on center to the door faces. Exterior doors shall receive an additional closed top made of 16-gauge galvanized steel, welded, ground

smooth and dressed to seal the top of the door. Openings shall be provided in the bottom channel to permit the escape of entrapped moisture.

- C. Exterior Doors: Thermally insulated.
 - 1. Grade: ANSI A250.8 - SDI-100; Level 3 - Extra Heavy-Duty, Physical Performance Level A, Model 2 - Seamless (16 gage).
 - a. Exception: Grade for all doors in frame openings over 72" wide: Level 4, physical performance Level A, Model 2, seamless (14 gage).
 - b. Thermal Performance: U 0.29; R 3.4 for door, thermally-broken frame and threshold assembly.
 - 2. Non-Fire Rated Door Core: Polystyrene foam block, spanning the full thickness of the interior spaces of the door and securely attached to the faces using an epoxy glue.
 - 3. Fire Rated Door Core: Non-asbestos mineral fiberboard.
 - 4. Door Thickness: 1-3/4 inch, nominal.
 - 5. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653, with A60/ZF180 coating.

2.05 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.
- C. General:
 - 1. Frames for Hollow Metal Doors:
 - a. ANSI A250.8 Level 3 Door Frames: 14 gage, 0.067 inch, minimum thickness.
 - 2. Frames for Wood Doors:
 - a. Interior Opening 42 inches and less: 16 gage frames.
 - 3. Provide minimum 16 gage mortar guard boxes at hardware cut-outs in frames for masonry walls and at strike reinforcement in frames for stud partitions.
 - 4. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units, unless detailed otherwise.
 - 5. Frames Wider than 48 Inches: Reinforce with steel channel, minimum 12 gage, factory welded to the frame head, flush with top. Such stiffeners shall not be used as lintels or load-carrying members.
 - 6. Provide welded continuous 12 gage reinforcement for continuous hinges.
- D. Exterior Door Frames, Non-Fire-Rated: Fully welded type.
 - 1. Thermally broken.
 - 2. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A 653, with A60/ZF180 coating.
- E. Exterior Door Frames, Fire Rated: Fully welded type. Fire rating label shall match door.
 - 1. Galvanizing: All components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653, with A60/ZF180 coating.
- F. Interior Doors, Non-Fire-Rated:
 - 1. Grade: ANSI A250.8 - SDI-100; Level 2 - Heavy-Duty, Physical Performance Level B, Model 2 - Seamless. (18 gage).
 - 2. Core: Vertical steel stiffeners, minimum 20 gage and 8 " apart, securely attached to both face sheets by spot welds not more than 4" on center. Provide sound deadening batt type mineral wool between each stiffener for the full length of the door.
 - 3. Door Thickness: 1-3/4 inch, nominal.
- G. Corner joints shall be die mitered. Exterior frames shall have all contact edges closed tight and continuously welded. Interior frames shall have all contact edges closed tight and faces continuously welded.

- H. Frame, trim and profiles shall be as scheduled by the Architect and verified by the Contractor. All frame depths shall be coordinated with partition type depths by the Contractor. Frames for drywall partitions shall have 1/2 inch backbends with hooked profile, unless detailed otherwise.
- I. Minimum depth of stops shall be 5/8". Use 3/4" only where required for fire rating or security.
- J. When shipping limitations so dictate, frames for large openings shall be fabricated in sections designed for splicing in the field. All splicing locations and details shall be clearly identified on shop drawings.
- K. Frames shall be provided with supplemental internal concealed steel reinforcement, as engineered by the manufacturer.
- L. Floor Anchors: Shall be securely welded inside each jamb, with 2 holes provided at each jamb for floor anchorage. Where required adjustable floor anchors, providing not less than 2" height adjustment, shall be provided. Minimum thickness of floor anchors shall be 14 gage, zinc coated per ASTM A591.
- M. Masonry Jamb Anchors: Frames for installation in masonry walls shall be provided with adjustable jamb anchors of the T-strap type, 16 gage minimum, zinc coated per ASTM A591. Provide 3 anchors for frames up to 7'-6" high, 4 anchors for frames up to 8'-0" high and 1 additional anchor for each 2'-0" of height over 8'-0".
- N. Stud Partition Jamb Anchors: Shall be steel anchors, compatible with the actual stud used, minimum 18 gage thickness, zinc coated per ASTM A-591 Provide 4 anchors for frames up to 7'-6" high, 5 anchors for frames up to 8'-0" high and 1 additional anchor for each 2'-0" of height over 8'-0".
- O. Frames may be anchored to previously placed concrete, masonry or structural steel only with the prior approval of the Architect. Such frames shall be provided with anchors and fasteners of suitable design. Provide a minimum of 4 anchors per jamb plus additional anchors in quantities as scheduled above for frames in stud partitions.

2.06 ACCESSORIES

- A. Grout for Frames: Portland cement grout with maximum 4 inch slump for hand troweling; thinner pumpable grout is prohibited.
- B. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for all factory or shop-assembled frames.

2.07 FINISHES

- A. Primer: Factory applied, rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.
- B. After fabrication, all tool marks and surface imperfections shall be dressed, permanently filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall be primed to ensure maximum paint adhesion, on all exposed surfaces with a rust-inhibitive primer in accordance with ANSI A250 - Test Procedure and Acceptance Criteria for Primed Painted Steel Surfaces.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. The Contractor shall take all measurements, make all investigations, and in general, provide field work and coordination as required to ensure the proper fit of all Work specified herein. Frames shall be sized, positioned, and installed in accordance with the design intent represented on the Drawings. The design intent shall not be modified due to the Contractor's failure to provide coordination or obtain properly fabricated materials. Such coordination shall be provided sufficiently in advance so as to avoid delays in the construction schedule.

- B. Verify that opening sizes and tolerances are acceptable. It shall be the responsibility of the Contractor to coordinate frame thicknesses with each wall and partition type to ensure proper fit.
- C. Verify that finished walls are in plane to ensure proper door alignment.
- D. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.02 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80 and ASTM E119.
- C. Coordinate frame anchor placement with wall construction. Wherever possible, leave frame spreader bars intact until frames are set perfectly square and plumb, and anchors are securely attached. Verify that frames are square and plumb following removal of temporary spreaders.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Coordinate installation of hardware in accordance with hardware manufacturer's templates and instructions. Doors and frames fabricated with hardware cutouts and reinforcing which will not properly accommodate finish hardware shall be rejected and replaced at no additional cost to the Owner.
- F. Immediately after erection, areas where prime coat or galvanizing has been damaged shall be sanded smooth and touch up with same primer or zinc rich rust-inhibitor primer as applied at the factory. Remove rust before touch-up is applied.

3.04 TOLERANCES

- A. Clearances Between Door and Frame:
 - 1. Between steel doors and frame, at head and jambs: 1/8", with maximum 1/16" +/- variation.
 - 2. Between wood doors and frame, at head and jambs: 1/8" maximum.
 - 3. At door bottoms: 3/4" maximum
 - 4. At smoke-rated door bottoms: 3/8" maximum.
 - 5. Between meeting edges of pairs of doors: 1/8" maximum.
 - 6. Between face of door and stop: 1/8".
 - 7. Note: Door sills, except at fire-rated doors, may be undercut greater than the clearances indicated above if so scheduled on the Drawings and/or on the Door & Frame Schedule.
- B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

3.05 ADJUSTING

- A. Adjust for smooth and balanced door movement.
- B. Protect installed doors, frames and accessories against damage from other construction work. Any damage prior to acceptance shall be repaired or replaced, if such action complies with the requirements and shows no evidence of repair or refinishing.

3.06 SCHEDULE

- A. Refer to Door and Frame Schedule on the Drawings.

END OF SECTION

SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Factory finished flush wood doors.

1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 71 00 - Door Hardware.
- C. Section 08 80 00 - Glazing: Site glazing of doors.

1.03 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics. Submit manufacturer's certification of compliance with quality standards.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Specimen warranty.
- E. Samples:
 - 1. Upon request, submit one sample of door construction, 8x8 inch in size cut from top corner of door and samples of lite frame section.
 - 2. Submit one full set of manufacturer's standard stain colors on specified veneer for selection.
 - 3. Submit two samples of door veneer, 6x6 inch in size illustrating selected wood grain, stain color, and sheen.
 - 4. Samples submitted and accepted shall serve to reflect the entire range of (color, texture, grain and sapwood/heartwood variation and shall be used as the standard for acceptance or rejection of installed materials.
- F. Manufacturer's certification that products are manufactured in the United States.
- G. Manufacturer's Installation Instructions: Indicate special installation instructions.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum ten years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials during transit, storage, and handling to prevent deterioration, damage and soiling. Package each door at the factory in a separate heavy sealed poly bag. Mark each bag at top and bottom of doors for location to correspond with opening number on the Drawings.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage. In the event of damage, immediately make all repairs and replacements necessary for approval of the Architect and at no additional cost to the Owner.
- C. Protect doors with resilient packaging. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation. Deliver door to job site only when building is dry and has reached average prevailing relative humidity of locality.

- D. Coordinate the work with door opening construction, door frame and door hardware installation. The Contractor shall take all measurements, make all investigations, and in general provide field work and coordination as required to ensure the proper fit of all Work specified herein. Doors and frames shall be sized, positioned and installed in accordance with the design intent represented on the Drawings. The design intent shall not be modified due to the Contractor's failure to provide coordination or obtain properly fabricated materials. Such coordination shall be provided sufficiently in advance so as to avoid delays in the construction schedule.

1.07 WARRANTY

- A. See Section 01 78 10 - Warranties for additional warranty requirements.
- B. Include coverage for delamination of veneer, defective materials, telegraphing core construction, and warping. Unsatisfactory warpage shall be more than 1/4" in a 42" x 84" section and telegraphed core construction shall be defined as exceeding 0.01 inch in a 3 inch span. The warranty shall also include refinishing and reinstalling which may be required due to repair or replacement of defective doors.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Graham Wood Doors
 - 2. Eggers Industries.
 - 3. Marshfield Door Systems, Inc.
 - 4. Buell Door Co.
 - 5. Algoma Hardwoods, Inc.
 - 6. VT Industries.
 - 7. Mohawk Flush Doors.
 - 8. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS

- A. All Doors: Wood veneer faced doors; 5-ply; 1-3/4 inch thickness; solid core flush construction. AWI Custom grade.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core: Type particleboard core (PC), plies and faces as indicated.
- B. Doors scheduled to receive closers and /or exit devices shall have solid lumber rails. Thru-bolting of finish hardware shall not be permitted, unless specifically noted elsewhere in the Construction Documents.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: Maple, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 - 1. Vertical Edges: Same species as face veneer.

2.05 ACCESSORIES

- A. Glazing: As specified in Section 08 80 00.
- B. Glazing Stops: Wood, of same species as door facing, mitered corners; prepared for concealed tamperproof fasteners at wood and countersunk oval head screws at metal frames. Fill fastener holes with color matching filler in the field.
 - 1. Note: The bottom edge of all lites shall be at least 10 inches above the floor and not more than 43 inches above the floor.

2.06 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.

- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge and top of door for closer and other hardware reinforcement as required.
 - 2. Provide solid blocking for other throughbolted hardware.
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- E. Provide edge clearances in accordance with the quality standard specified.

2.07 FACTORY FINISHING - WOOD VENEER DOORS

- A. Factory finish doors in accordance with specified quality standard:
 - 1. Transparent Finish: Transparent catalyzed polyurethane, Premium quality, AWI TR-6 equal to Algoma Hardwoods "Univar" Catalyzed Polyurethane or Eggers Industries "Gardall II".
- B. Factory finish doors in accordance with approved sample.
- C. Seal door top edge with color sealer to match door facing.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine all doors before hanging and reject doors with defects.
- B. Verify existing conditions before starting work.
- C. Verify that opening sizes and tolerances are acceptable.
- D. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Coordinate installation of glazing.

3.03 TOLERANCES

- A. Conform to specified quality standard for telegraphing, warp, and squareness.
- B. Edge Clearances shall be provided as follows:
 - 1. Between wood doors and steel frames at heads and jambs: 1/8" maximum.
 - 2. At door bottoms: 3/4" maximum.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.
- C. Align in frames for uniform clearance at each edge. Restore finish before installation if on-site fitting or machining is required. Replace or re-hang any doors which do not swing or operate freely, or are warped or twisted. Pre-finished doors damaged prior to acceptance shall be repaired or replaced. Doors may be prepared or refinished if work complies with requirements and show no evidence of repair or refinishing.

3.05 SCHEDULE

- A. Refer to Door and Frame Schedule on the Drawings.

END OF SECTION

SECTION 08 31 00
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall and ceiling access door and frame units.
- B. It is not intended that the Drawings or Specifications identify specific access door sizes or locations. Subcontractors whose work requires access panels in wall, floor, and ceiling assemblies shall thoroughly examine all Construction Documents and provide suitable access to all equipment, hardware, accessories and all other items that may require adjustment, observation or maintenance. Note: Access doors located in mechanical equipment or ductwork are provided as part of the work of Division 23 - HVAC.

1.02 RELATED REQUIREMENTS

- A. Section 04 20 00 - Unit Masonry:: Openings in masonry.
- B. Section 09 21 16 - Gypsum Board Assemblies: Openings in partitions and ceilings.
- C. Section 08 71 00 - Door Hardware: Mortise cylinder and core hardware.
- D. Section 09 90 00 Painting and Coating: Field paint finish.
- E. Division 22 - Plumbing
- F. Division 23 - HVAC
- G. Division 26 - Electrical

1.03 REFERENCE STANDARDS

- A. ITS - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- B. UL - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide materials, construction, profiles, types, finishes, hardware, locking provisions, and details of adjoining work.
- C. Shop Drawings: Indicate exact position of all access door units.
- D. Project Record Documents: Record actual locations of all access units.

PART 2 PRODUCTS

2.01 WALL AND CEILING UNITS

- A. Manufacturers:
 - 1. Karp Associates, Inc.
 - 2. Milcor.
 - 3. Nystrom Products.
 - 4. Larsens Manufacturing Co.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Access Doors: Factory fabricated door and frame units, fully assembled units with corner joints welded, filled, and ground flush; square and without rack or warp; coordinate requirements with assemblies that units are to be installed in.
 - 1. Material: Steel.
 - 2. Style: Exposed frame with door surface flush with frame surface.
 - a. In Gypsum Board: Use drywall bead type frame.
 - b. In Masonry: Provide adjustable metal masonry anchors.
 - 3. Door Style: Single thickness with rolled or turned in edges.

4. Door Style for separating heated from non-heated areas: Double wall with integral non-combustible insulation filler.
5. Door Style for Fire-rated locations: Double wall with integral non-combustible insulation filler.
6. Frames: 16 gage, 0.0598 inch, minimum.
7. Single Thickness Steel Door Panels: 0.070 inch, minimum.
8. Double-Skinned Hollow Steel Door Panels: 16 gage, 0.059 inch, minimum, on both sides and each edge.
9. Insulation: Non-combustible mineral or glass fiber.
10. Units in Fire Rated Assemblies: Fire rating as required by applicable code for the fire rated assembly that access doors are being installed.
 - a. Provide products listed and labeled by UL or ITS (Warnock Hersey) as suitable for the purpose specified and indicated (labeled for horizontal or vertical installation).
11. Finish: Factory prime painted for field finish painting.
12. Size: As required for each condition, minimum size 8" x 8".
13. Hardware:
 - a. Hardware for Fire Rated Units: As required for listing.
 - b. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
 - c. Latch/Lock: Cylinder lock operated cam latch, two keys for each unit.
 - 1) Mortise cylinder and core specified in Section 08 71 00.
 - d. Inside Latch Release: For all doors intended to allow a person to fully pass through, provide Mechanism that allows the panel to be opened from the inside without the use of a tool or key
 - e. Gasketing: For all doors that separate heated and unheated space. Extruded neoprene, around the perimeter of the door panel.
 - f. Horizontal Applications: Equip with restraints to prevent doors from falling open or closed upon release. All doors greater in size than 300 square inches and installed horizontally shall be provided with the following sign in 1/2" high red letters adjacent to the door lock: "Caution: Door will drop upon lock release".

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that rough openings for door and frame are correctly sized and located.
- B. Door locations that may physically or visually conflict with adjacent construction or building features shall be brought to the attention of the Architect prior to 'roughing-in'. Doors installed in locations objectionable to the Architect shall be removed, patched, and relocated at no additional cost to the Owner.

3.02 INSTALLATION

- A. Install units in accordance with manufacturer's instructions.
- B. Install frames plumb and level in openings. Secure rigidly in place.
- C. Position units to provide convenient access to the concealed work requiring access.
- D. Adjust hardware and panels after installation for proper operation.
- E. Door lock keys shall be labeled and turned over to the Owner per Project Close-out requirements.

END OF SECTION

SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aluminum-framed curtain wall, with vision glazing and glass and metal infill panels.
- B. Perimeter sealant.
- C. Firestopping between curtain wall and edge of floor slab.

1.02 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel: Steel attachment members.
- B. Section 07 25 00 - Weather Barriers: Sealing framing to weather barrier installed on adjacent construction.
- C. Section 07 84 00 - Firestopping: Firestop at system junction with structure.
- D. Section 07 90 05 - Joint Sealers: Perimeter sealant and back-up materials.
- E. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2012.
- B. AAMA 501.1 - Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure; 2005.
- C. AAMA 501.2 - Field Check of Metal Storefronts, Curtain Walls, and Sloped Glazing Systems for Water Leakage; 2009 (part of AAMA 501).
- D. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2012.
- E. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.
- F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels; 2013.
- G. ASCE 7 - Minimum Design Loads for Buildings and Other Structures; 2011.
- H. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- I. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- J. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2006 (Reapproved 2011).
- K. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants; 2005 (Reapproved 2010).
- L. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants; 2015.
- M. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- N. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2000 (Reapproved 2011).
- O. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants; 2000 (Reapproved 2011).
- P. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2014.
- Q. ASTM C1249 - Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications; 2006 (Reapproved 2010)
- R. ASTM C1401 - Standard Guide for Structural Sealant Glazing; 2014.

- S. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- T. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.
- U. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).
- V. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Differential; 2000 (Reapproved 2009).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of other components that comprise the exterior enclosure.
- B. Pre-installation Meeting: Conduct a pre-installation meeting at least 2 weeks before starting work of this Section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data:
 - 1. Submit curtainwall system product data including materials, component dimensions, describe components within assembly, anchorage and fasteners, glazing and infill, 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.
 - 1. Include the design engineer's stamp or seal on each sheet of shop drawings.
- D. Shop Drawings: Provide details of proposed weather sealant joints indicating dimensions, materials, bite, thicknesses, profile, and support framing.
- E. Design Data: Submit framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure, sealed and signed by a qualified professional structural engineer, licensed in the State of New Hampshire.
- F. Samples: Submit two samples 3 x 3 inches in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.
- G. 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.
- H. Field Quality Control Submittals: Report of field testing for water leakage.
- I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

- A. Structural Designer Qualifications: Design structural support framing components 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. Manufacturer and Installer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum fifteen years of documented experience.
- C. Fabricator / Installer: Company specializing in the work of this Section with a minimum of ten years of documented experience and approved by the manufacturer.

1.07 MOCK-UP AND SAMPLE INSTALLATIONS

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-ups.

- B. Sample Installation: Upon the commencement of the curtain wall installation, provide a minimum 10 linear feet sample installation including all components occurring on the Project. Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors and perimeter sealant.
 - 1. Sample installation shall demonstrate actual wall construction, detailing and workmanship.
 - 2. No work shall progress until the Architect has reviewed the sample installation. Installation shall be revised as necessary to secure the Architect's acceptance and shall then become the standard of comparison for all similar units.
- C. Locate where directed. Accepted sample installation may remain as part of the Work.

1.08 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.

1.09 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.

1.10 WARRANTY

- A. See Section 01 78 00 - Project Close-out, for additional warranty requirements.
- B. Provide (10) ten 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 (20) twenty year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Series 1600UT by Kawneer Company Inc
- B. Acceptable Manufacturers:
 - 1. EFCO
 - 2. YKK AP America Inc
 - 3. Oldcastle Building Envelope.
 - 4. Substitutions: See Section 01 60 00 – Product Requirements.

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. Glazing Systems:
 - a. Outside glazed, with pressure plate and mullion cover, where indicated on drawings.
 - 1) Type MC-1: Mullion cap; #832-095 by Kawneer.
 - 2) Type MC-2: Mullion cap; #832-096 by Kawneer.
 - 3) Type MC-3: Mullion cap; #814-591 by Kawneer
 - 4) Where no mullion cap type is indicated per the Drawings provide manufacturer standard 3/4 inches x 2 1/2 inch cap profile.
 - 2. Vertical Mullion Face Width: 2 1/2 inches.
 - 3. Vertical Mullion Depth From Face of Glazing to Back of Frame: 6 inches.
 - 4. Finish: Kawneer Permafluor (70% PVDF), AAMA 2605, Fluoropolymer Coating.
 - a. Color: Selected by Architect from manufacturer standard color pallet.
 - b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

5. 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. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
7. 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.
8. 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.
9. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

2.03 PERFORMANCE REQUIREMENTS

- A. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
 1. Basic Wind Speed: 100 MPH, see Structural Drawings.
 2. Wall Design Wind Pressures: +28.5 psf; - 30 PSF. At wall corners: +28.5 psf, - 51.5 PSF.
 3. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with the requirements of ASCE 7.
 4. 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.
- B. Water Penetration Resistance: No uncontrolled water on indoor face when tested as follows:
 1. Test Pressure Differential: 15 psf.
 2. Test Method: AAMA 501.1.
- C. Air Leakage: Maximum of 0.09 cu ft/min sq ft of wall area, when tested in accordance with ASTM E783 at 6.27 psf pressure differential across assembly.
- D. Thermal Performance Requirements:
 1. Condensation Resistance Factor of Framing, AAMA 1503: 76, minimum.
 2. Overall U-value Including Glazing: 0.33 Btu/(hr sq ft deg F), maximum.

2.04 COMPONENTS

- A. Aluminum-Framed Curtain Wall: High performance, improved thermal break system, factory fabricated, factory finished aluminum framing members, and related flashings, anchorage and attachment devices.
- B. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Framing members for interior applications need not be thermally broken.
- C. Glazing: As specified in Section 08 80 00.
- D. Infill Panels: As specified in Section 08 80 00.
- E. Operable Sash: Thermally broken, aluminum project-out; finished to match curtain wall; turn handle latch, 4-bar hinges, opening stops and wicket screens in color matched aluminum frames with dark aluminum screening.
 1. Basis of Design: GLASSvent by Kawneer Company Inc
- F. Swing Doors: Glazed aluminum.
 1. Thickness: 1 3/4 inches.
 2. Top Rail: 2 3/4 inches wide.

3. Vertical Stiles: 2 3/4 inches wide.
 4. Bottom Rail: 10 inches wide.
 5. Glazing Stops: Square.
 6. Finish: Same as curtainwall.
 7. Hardware:
 - a. For each door, include weatherstripping, sill sweep strip, and threshold.
 - b. Other hardware see Section 08 71 00.
 8. Product: Narrow Stile 310 by Kawneer Company Inc.
- G. Subsills: Prefinished aluminum, shapes as indicated on the Drawings.
- H. Interior Snap Trim: Aluminum extrusions; finish shall match curtain wall; sizes as indicated on the Drawings.

2.05 MATERIALS

- A. Extruded Aluminum: ASTM B221.
- B. Sheet Aluminum: ASTM B209.
- C. Structural Steel Sections: ASTM A36; galvanized in accordance with requirements of ASTM A123.
- D. Structural Supporting Anchors Attached to Structural Steel: Design for bolted attachment.
- E. Fasteners: Stainless steel. Any exposed fasteners shall match curtainwall finish.
- F. Exposed Flashings: 0.032 inch thick aluminum sheet; finish to match framing members.
- G. Firestopping: As specified in Section 07 84 00.
- H. Perimeter Sealant: Silicone as specified in Section 07 90 05.
- I. Glazing Accessories: Gaskets high thermal efficiency type; and as specified in Section 08 80 00.
- J. Perimeter Transition System: Flexible system to transition between exterior aluminum curtainwall framing members and wall weather barrier system to maintain air, water and vapor seal. System includes dense translucent silicone transition panels, molded corners, extruded aluminum adaptors and silicone sealant for connection to aluminum framing, if required.
 1. Product: Tremco Proglaze ETA - System 3 typical or as details require.

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. Curtainwall Framing Installation:
 1. Install curtain wall system in accordance with manufacturer's instructions.
 2. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
 3. Provide alignment attachments and shims to permanently fasten system to building structure.
 4. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
 5. Provide thermal isolation where components penetrate or disrupt building insulation.
 6. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

7. Coordinate attachment and seal of perimeter air and vapor barrier materials. See Section 07 25 00.
 8. Install firestopping at each floor slab edge.
 9. Install foamed-in insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
 10. Install operating sash.
- B. Pressure Plate Framing: Install glazing and infill panels in accordance with Section 08 80 00, using exterior dry glazing method.
 - C. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions.
 - D. Install perimeter sealant in accordance with Section 07 90 05.
 - E. 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 the services of the manufacturer's field representative to observe installation and make report.
- B. See Section 01 40 00 - Quality Requirements, for general requirements for testing and inspection.
- C. The manufacturer's structural engineer shall inspect the curtain wall installation, component type, size, spacing and placement for conformance with the approved curtain wall system design and check member-to member connections and connections to adjacent steel support elements, once during performance of the work and once after completion of the work.
- D. Test installed curtain wall for water leakage in accordance with AAMA 501.2.
- E. Replace curtain wall components that have failed field testing and retest until performance is satisfactory.

3.05 ADJUSTING

- A. Adjust operating 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. Take care to remove dirt from corners. Wipe surfaces clean.

3.07 PROTECTION

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

END OF SECTION

SECTION 08 71 00
DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Hardware for wood, hollow steel, and aluminum doors.
- B. Electro-mechanically operated and controlled hardware.
- C. Lock cylinders for doors for which hardware is specified in other Sections.

1.02 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames.
- B. Section 08 14 16 - Flush Wood Doors.
- C. Section 08 44 13 - Glazed Aluminum Curtain Walls: Hardware for integral doors and frames except lock cylinders; installation of cylinders.

1.03 REFERENCE STANDARDS

- A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council ; 2003.
- B. ANSI/BHMA A156 Series - Certified Product Standards, most current edition.
- C. 36 CFR 1191 - Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities, 2011 ; current edition
- D. DHI WDHS.3 - Recommended Locations for Architectural Hardware for Flush Wood Doors; Door and Hardware Institute ; 1993; also in WDHS-1/WDHS-5 Series, 1996.
- E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives ; 2010.
- F. NFPA 101 - Life Safety Code.
- G. NFPA 105 - Smoke and Draft Control Door Assemblies, latest edition.
- H. UL 10B - Fire Tests of Door Assemblies.
- I. UL 305 - Panic Hardware.
- J. UL - Building Materials Directory; Underwriters Laboratories Inc. ; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
- B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
- C. Convey Owner's keying requirements to manufacturers.
- D. Pre-installation Meeting: Convene a pre-installation meeting at least 3 weeks prior to commencing work of this Section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this Project.
 - 1. Name and manufacturer of each item, type, style, function, size and finish for each item.
 - 2. Door and frame sizes, thicknesses, materials, hand, degrees of opening for doors, with closers and/or overhead holders, and labeling.
 - 3. Explanation of all abbreviations, symbols, and codes used on schedules, and any other relevant information.

4. The schedule shall be reviewed prior to submission by a certified Architectural Hardware Consultant (AHC).
- C. Samples:
 1. Upon request, submit 1 sample of hinge, latchset, lockset, and closer illustrating style, color, and finish.
 2. Approved samples will be incorporated into the Work. Rejected samples will be returned to the contractor and shall be re-submitted.
- D. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents.
- E. Keying Schedule: It shall be the responsibility of the hardware supplier to meet with the Owner to determine and coordinate keying with door hardware for the Project. Submit separate detailed schedule, indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
 1. Function of door, flow of traffic, degree of security required, lockset function and future expansion plans.
 2. Preliminary key system schematic diagram.
 3. Requirements for key control system.
 4. Address for delivery of keys.
- F. Wiring Diagrams: Submit complete and detailed system operation and electrical diagrams specially developed for each opening with electrified hardware, except openings where only magnetic hold-opens or door position switches are specified.
- G. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention .
- H. Close-out Documents:
 1. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.
 2. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
 3. Catalog pages for each product, contact information for local representative for each manufacturer.
 4. All warranties and certification that electronic security hardware has been inspected and proper operation has been verified.
- I. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
- J. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- K. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 2. Extra Lock Cylinders: One for each master keyed group.
 3. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum twenty years of documented experience.
- B. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with ten years of experience.
- C. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

- D. Electronic Security Hardware: The hardware supplier shall employ the Owner's Security Consultant who shall:
 - 1. Produce wiring diagrams and consulting as needed,
 - 2. Coordinate installation of the electronic security hardware with related sub-contractors,
 - 3. Verify that all components are working properly upon completion of the electronic security hardware installation.
- E. Quantities: Furnish appropriate hardware for all doors in the Project. Approval of incomplete hardware schedule or acceptance of incorrect quantities at the job site will not alter this requirement. It is the intent of the hardware sets, indicated in Part 3 of this Section, to accurately list the hardware required for each door on this Project. However, should any doors have been inadvertently omitted from the sets it will be the hardware supplier's responsibility to furnish hardware for these doors that is of the same quality, type, size, function, and finish as that specified for similar doors on the Project.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. All hardware shall be brought to the job site in the manufacturer's original packaging, with each hardware item individually labeled and identified with door opening code to match hardware schedule.

1.08 WARRANTY

- A. See Section 01 78 10 - Warranties, for additional warranty requirements.
- B. All finish hardware shall be warranted against manufacturing defects and faulty workmanship for a period of two years from the date of Substantial Completion, except for the following:
 - 1. Non-electronic door closers shall be warranted for ten years.
 - 2. Non-electrified exit devices shall be warranted for three years.
 - 3. Hinges shall be warranted for the life of the building.
 - 4. Continuous hinges shall be warranted for ten years.
 - 5. Electromechanical door hardware shall be warranted for two years.
- C. The hardware supplier, at his expense, shall adjust, repair, or replace, including labor for installation, any finish hardware supplied under this Section, which is found to be malfunctioning or defective during the above warrantee periods, except due to abuse.

PART 2 PRODUCTS

2.01 DOOR HARDWARE - GENERAL

- A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
- B. Provide all items of a single type of the same model by the same manufacturer.
- C. Provide products that comply with the following:
 - 1. Applicable provisions of federal, state, and local codes.
 - 2. ANSI/ICC A117.1, American National Standard for Accessible and Usable Buildings and Facilities.
 - 3. All Hardware on Fire-Rated Doors : Listed and classified by UL as suitable for the purpose specified and indicated.
 - 4. Hardware for Smoke and Draft Control Doors : Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
- D. Electrically Operated and/or Controlled Hardware: Provide all power supplies, power transfer hinges, relays, and interfaces required for proper operation; provide wiring between hardware and control components and to building power connection.
- E. Finishes: All door hardware the same finish unless otherwise indicated.
 - 1. In general, all hardware shall be US26D (satin chromium), unless otherwise.
 - 2. Exit devices, pulls, push plates, and kick plates: US32D (satin stainless steel).
 - 3. Closers: Sprayed enamel or baked epoxy powder to match.

4. Continuous geared hinges: natural satin anodized.
 5. Gaskets: natural satin anodized aluminum.
- F. Fasteners:
1. All hardware shall be installed with fasteners provided by the hardware manufacturer. Exposed fasteners shall be finished to match the hardware finish. Generally, fasteners for hardware shall be concealed when the door is closed.
- G. Acceptable Manufacturers: Only hardware manufactured by one of the companies indicated below shall be accepted for use in the Project, and acceptance is limited only to the category of hardware for which the manufacturer is specified or listed as an acceptable equal.

2.02 ELECTRONIC ACCESS CONTROLS

- A. Contractor shall employ Impact Security Company, the Owner's security vendor to provide all card readers, associated wiring, system programming, security door hardware control equipment modifications and panel expansion required for this Project.
1. At Police Entry door provide an integrated door buzzer feature tied into the door auto-operator and electric strike hardware. Buzzer shall ring at the main police reception desk. Activation of the release buzzer at the main reception desk shall disengage the electric strike and signal the door operator to open the door.

2.03 HINGES

- A. Hinges: Provide hinges on every swinging door.
1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
 2. Provide ball-bearing hinges at all doors.
 3. Hinge pins shall be steel non-rising at interior doors.
 4. Provide hinges in the quantities indicated.
 5. Provide non-removable pins on exterior outswinging doors.
 6. Comply with BHMA A156.1 and A156.7; standard weight, 4-1/2" high, for doors up to 3 feet wide; heavy weight, 5" high, for doors over 3 feet wide.
 7. Provide hinge width of 4" or as required to clear surrounding trim. Provide long throw or clear swing hinges where frames are recessed in the wall and where greater than 110 degree swing is required.
 8. Materials: Interior hinges shall be steel.
- B. Quantity of Hinges Per Door:
1. Doors From 60 inches High up to 90 inches High: Three hinges.
- C. Basis of Design:
1. Stanley FBB179 (up to 3 feet wide).
 2. Stanley FBB168 (greater than 3 feet wide).
 3. McKinney TB2714 (up to 3 feet wide).
 4. McKinney T4B3786 (greater than 3 feet wide).
- D. Acceptable Manufacturers:
1. Hager Companies.
 2. Stanley Hardware.
 3. Ives.

2.04 CONTINUOUS HINGES

- A. Continuous Hinges: Heavy duty, 6063-T aluminum; split nylon bearings or stainless steel bearings at each hinge knuckle for quiet, smooth, self-lubricating operation. Hinges shall be capable of supporting door weights up to 600 pounds, and shall be successfully tested for 1,500,000 cycles. On fire-rated door assemblies, provide UL listed hinges. Install hinges with fasteners supplied by the manufacturer. Hole pattern shall be symmetrical.
- B. Basis of Design:
1. Ives 224HD (mortised, full edge protection)
 2. Roton

2.05 KEYING

- A. General:
 - 1. The hardware supplier shall make himself available early in the submittal process for a meeting with the Owner to review lock functions and keying requirements for this Project.
 - 2. When providing keying information, comply with DHI Handbook - Keying Systems and Nomenclature
- B. Lock Cylinders:
 - 1. Cylinders and keys shall be provided by the Owner. Small format.
 - a. Hardware supplier shall coordinate Owner cylinder requirements as required.
 - 2. Cylinders shall be removable core type.
- C. Keying:
 - 1. Include construction keying and control keying with removable core cylinders to Owner's key system.
 - 2. Key to existing keying system.
 - 3. Construction Keying with Removable Core Cylinders: Include removal of construction cores and replacement with permanent key removable masterkeyed cores.
 - 4. All doors shall be construction keyed.
 - 5. Supply keys in the following quantities:
 - a. 5 master keys.
 - b. 3 grand master keys.
 - c. 4 construction keys.
 - d. 3 change keys for each lock.
 - 6. Factory key all cylinders with the manufacturer retaining permanent keying records. One bitting list sent registered mail, confidential, shall be furnished for the Owner's use.
 - 7. All keys shall be stamped with their respective key set number. Master keys shall be stamped with their respective master key set letters. Do not stamp any keys with the factory key change number. Do not stamp any cores with the key set on the face (front) of the core. Stamp identification on back or side of the cores.

2.06 CYLINDRICAL (BORED) LOCKSETS

- A. Cylindrical (Bored) Locksets: ANSI A156.2, Grade 1, with heavy duty roller bearings and compression springs, and heavy duty cast mounting plate to prevent lock chassis loosening. Cylindrical housing shall be heavy gauge cold rolled steel with corrosion resistive coating.
 - 1. Lever trim shall be wrought. Levers shall be pressure cast zinc, plated with finish as specified.
 - 2. All doors opening into or from hazardous areas shall have knurled or roughened levers for tactile warning to the visually impaired.
 - 3. Provide wrought boxes and strikes with proper lip length to protect trim but not to project more than 1/8 inch beyond trim, frame or inactive leaf.
 - 4. All lock functions shall be reviewed with the Owner during the keying meeting prior to ordering.
- B. Basis of Design:
 - 1. Yale 5400 LN, lever style AU.
 - 2. Schlage D Series, lever style Rhodes.
 - 3. Sargent 10 Line.
 - 4. Best 15C Series.

2.07 ELECTRIC STRIKES

- A. Electric Strikes: ANSI/BHMA A156.5, BHMA 501, Grade 1 compliant; UL listed for Burglary Resistance, UL listed for use on fire-rated door assemblies.
 - 1. Provide single unit, field adjustable, Fail-Safe or Fail-Secure operation as specified in the Hardware Schedule or as required by the Owner.
 - 2. Coordinate and provide frame preparations. Units shall be wired to the building security system by the Electrical Contractor.

3. Finish shall match door hardware.

B. Basis of Design:

1. HES 9600.

2.08 EXIT DEVICES

A. Locking Functions: Functions as defined in BHMA A156.3, and as follows:

1. Entry/Exit, Always-Unlocked: Outside lever unlocked, no outside key access, no latch holdback.
2. Entry/Exit, Free Swing: Key outside retracts latch, latch holdback (dogging) for free swing during occupied hours, not fire-rated; outside trim must be specified as lever or pull.
3. Entry/Exit, Always-Latched: Key outside locks and unlocks lever, no latch holdback (dogging).
4. Entry/Exit, Always-Locked: Key outside retracts latchbolt but does not unlock lever, no latch holdback.
5. Exit Only, Secure: No outside trim, no key entry, no latch holdback, deadlocking latchbolt.

B. Exit Devices: push-pad type, fabricated of brass, bronze, stainless steel, or aluminum, plated to match the architectural finish on the balance of the door hardware. All exit devices shall incorporate a fluid damper or other device to eliminate noise associated with device operation. The touch pad shall extend a minimum of one half of the door width. Only compression springs shall be used in devices, latches, and outside trims or controls. All devices shall incorporate a dead latching feature.

1. Exit devices shall be UL listed panic exit hardware. All devices for fire rated openings shall be UL labeled fire exit hardware.
2. Provide electric options as scheduled with all associated power units necessary for the proper operation of the device.
3. Provide forged or cast heavy duty outside lever trim to closely match interior lockset lever design. Levers shall be vandal-resistant type that will travel to a 90 degree down position when more than 35 pounds of torque is applied and which can easily be re-set.

C. Basis of Design:

1. Sargent 80 Series.

D. Acceptable Manufacturers:

1. Von Duprin.

2.09 CLOSERS

A. Closers: Comply with BHMA A156.4. Fully hydraulic rack and pinion action with a high strength cast iron 1-1/2" diameter cylinder and full cover. Hydraulic fluid shall not require seasonal closer adjustment for temperatures ranging from 120 to -30 degrees F. Hydraulic regulation shall be by tamper proof, non-critical valves.

1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
2. Provide a door closer on every exterior door, mounted at inside face of door.
3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
4. At corridors, locate door-mounted closer on room side of door.
5. Provide appropriate closers for doors required to swing 180 degrees.
6. Sizing of closers: Unless otherwise indicated, comply with the manufacturer's closer sizing recommendations for door size, exposure to weather, and anticipated frequency of use.
7. Closer Adjustment: Separate adjustment for latch speed, general speed, and backcheck; spring power shall be continuously adjustable over the full range of closer sizes and shall provide for reduced opening force for the physically challenged.
8. The Contractor shall adjust closing and latching speeds of all closers as required to provide smooth, continuous closing action.
9. Delayed Action: Provide ADA compliant delayed action option for all closers.

- B. Arms: Solid forged steel main arms and fore arms. All door closers shall be furnished with PARALLEL ARMS wherever possible and unless specified otherwise. In general, door closers shall be mounted on the "room" side of doors and shall not be visible in corridors, lobbies and other public spaces unless necessary.
 - 1. Attachment Accessories: As required to properly attach the closer to the door and frame; including, but not limited to: drop plates, spacers, brackets and special arms.
- C. Basis of Design:
 - 1. LCN 1460 Series
- D. Acceptable Manufacturers:
 - 1. Assa Abloy Sargent.

2.10 AUTOMATIC DOOR OPERATORS

- A. Low Energy Door Operators:
 - 1. Operators shall meet the requirements of ANSI 117.1 and ANSI A156.19 for low energy operators, and where required, UL listed for fire rated openings. Units shall function powered or as a standard door closer with adjustable spring force size 1 thru 6 for non-powered operation. Provide operator arms as required to suit job conditions.
 - 2. Operators shall be surface mounted with aluminum enclosures.
 - 3. Units shall be rated for door panels weighing up to 350 pounds.
 - 4. Unit shall be programmed for automatic or power-assisted manual opening, with the following adjustable settings: hold open time of up to 28 seconds; open speed; backcheck speed; vestibule sequence timer.
 - 5. Obstruction detection feature to meet A156.19 requirements.
 - 6. Provide a safety clutch to protect the door operator from mechanical damage if the door is forced open.
 - 7. Provide DIP switch controls for on-board diagnostics, power close, push and go operation, time delay logic for electrified hardware components.
 - 8. Include terminals for auxiliary controls to activate up to 2 devices and vestibule sequencing. Provide control switches for day/night/hold-open and illuminated power on-off.
 - 9. Permanent magnet DC motor, 3/15 horsepower. Power input: 115 VAC, Output: auxiliary 24 VAC.
 - 10. Provide safety signage.
 - 11. Supply all necessary equipment including controller, wall switches for use with the operator, push plate post, radio control transmitter/receivers, power supplies, etc.
 - 12. Finish: Satin aluminum clear anodized.
 - 13. Basis of Design:
 - a. Stanley D4990.
 - b. LCN 4640/4630 interconnect to electric strike.
 - 14. Acceptable manufacturers:
 - a. GyroTech

2.11 STOPS AND HOLDERS

- A. Stops: Comply with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
 - 1. Provide wall stops, unless otherwise indicated or if field conditions do not allow for a wall stop. Concealed blocking for attachment to walls shall be provided under Section 06 10 54.
 - 2. If wall stops are not practical, due to configuration of room or furnishings, review with Architect to determine if an overhead stop or floor stop shall be provided. It shall be the responsibility of the Contractor to properly coordinate stops to suit specific job conditions.
 - 3. A stop is not required at doors with magnetic door holders. A positive stop feature of the door closer is not an acceptable substitute for a stop unless specifically indicated.
- B. Basis of Design:

1. Stops: Ives WS407, FS436, or FS438 as suited to job conditions.
- C. Acceptable Manufacturers:
 1. Rockwood.
 2. Glynn-Johnson.

2.12 GASKETS

- A. Gaskets: Comply with BHMA A156.22.
 1. Weatherstripping: On each exterior door, provide weatherstripping gaskets, unless otherwise indicated at top, sides, and meeting rails of pairs.
 - a. Where exterior door is also required to have fire or smoke rating, provide gaskets functioning as both smoke and weather seals.
 - b. On each exterior door, provide door bottom sweep, unless otherwise indicated.
 2. Sound Gaskets: On doors indicated as "sound-rated", "acoustical", or with an STC rating, provide sound-rated gaskets and automatic door bottoms; make gaskets completely continuous, do not cut or notch gaskets for installation.
- B. Thresholds: Provide thresholds with barrier-free profiles.
 1. Thresholds shall be provided at each exterior door unless otherwise indicated.
 2. Field cut threshold to frame for tight fit. At openings with one or more mullions, cut out around mullions and extend continuously for the entire opening.
 3. Set thresholds in a continuous bead of sealant.
 4. Threshold Fasteners: Non-ferrous solid brass or stainless steel screws.
- C. Basis of Design:
 1. Gasket: Pemko PK550.
 2. Gasket (Sound): Pemko 303V
 3. Door Bottom: Pemko 4303DRL
 4. Door Bottom (Sound): Pemko 315N.
- D. Acceptable Manufacturers:
 1. National Guard Products, Inc.
 2. Zero International, Inc.

2.13 PROTECTION PLATES AND ARCHITECTURAL TRIM

- A. Silencers: Grey rubber plug-in type, not adhesive applied; 3 for each single frame, 2 for each paired door frame. All doors not scheduled to receive door stripping shall receive silencers.

2.14 CLEANING

- A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

2.15 PREPARATION

- A. For steel doors and frames: Comply with DHI "Recommended Locations for Architectural Hardware for Steel Doors and Frames."
 1. For steel doors and frames: See Section 08 11 13.
 2. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
- B. Install hardware in accordance with manufacturer's instructions and applicable codes.
- C. Hardware shall only be installed by experienced finish hardware installers. Set units level, plumb and true to line and locations.
- D. Verify that electric power is available to power operated devices and of the correct characteristics.
- E. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

PART 3 EXECUTION

3.01 TEMPLATES

- A. Use templates provided by hardware item manufacturer.
- B. Do not install surface mounted items until finishes applied to substrate are complete.
- C. For wood doors: Comply with DHI "Recommended Locations for Architectural Hardware for Wood Flush Doors."

3.02 ADJUSTING AND INSPECTION

- A. Provide an Architectural Hardware Consultant to inspect installation and certify that hardware and installation has been furnished and installed in accordance with manufacturer's instructions and as specified.
- B. Adjust and check each item of hardware and each door, to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly as intended for the application. Adjust door control devices to operate smoothly after building HVAC systems are operational for compliance with opening force requirements of the ADA Guidelines.
- C. After the hardware has been installed, the hardware supplier shall inspect the Project and ascertain that all items of hardware have been properly installed, fastened, and are functioning as required. Any discrepancies shall be called to the attention of the Contractor, who shall be responsible for correcting them.
- D. Clean adjacent surfaces soiled by hardware installation. All hardware shall be protected from dents and scratches. Hardware that is damaged prior to building completion shall be replaced at no cost to the Owner.
- E. Approximately six months after the date of Substantial Completion, the installer and/or representatives of the latchset, lockset, panic device, closer and door control device hardware manufacturers shall return to the Project to perform the following work:
 - 1. Examine and re-adjust each item of door hardware as necessary to restore proper function.
 - 2. Consult with and instruct the Owner's personnel in recommended maintenance procedures.
 - 3. Replace hardware items that have deteriorated or failed due to faulty design, materials or installation of hardware units.
 - 4. Prepare a written report of current and predicable problems of substantial nature in the performance of the hardware.

3.03 HARDWARE SETS

- A. Set 1: Single door
 - 1. Door Application(s): # 102A.
 - 2. 3 Hinges
 - 3. 1 Latchset - storeroom function
 - 4. 1 Closer
 - 5. 1 Stop
 - 6. 1 set Silencers
- B. Set 2: Single door
 - 1. Door Application(s): # 100A & # 100B.
 - 2. 1 Continuous Hinge
 - 3. 1 Exit Device
 - 4. 1 Key cylinder
 - 5. 1 Automatic Door Operator
 - 6. 1 Headstop with Spring Cushion
 - 7. 1 Electric Strike

8. 1 Stop
 9. Weatherstripping - Section 08 44 13
 10. Threshold - Section 08 44 13
 11. 1 Door Buzzer (See Electronic Access Control this Section)
- C. Set 3: Single door
1. Door Application(s): # 002A, # 003A, # 004A, # 005A & # 006A
 2. 3 Hinges
 3. 1 Exit Device/Pull
 4. 1 Key cylinder
 5. 1 Closer
 6. Weatherstripping
 7. Threshold

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Insulated glass units.
- B. Insulated glazed metal panels.
- C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 20 00 - Finish Carpentry: Millwork components with requirement for glass.
- B. Section 07 90 05 - Joint Sealers: Sealant and back-up material.
- C. Section 08 14 16 - Flush Wood Doors: Glazed doors.
- D. Section 08 44 13 - Glazed Aluminum Curtain Walls: Glazed curtainwall framing.

1.03 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.
- B. ANSI Z97.1 - Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2011).
- D. ASTM C1036 - Standard Specification for Flat Glass; 2011e1.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- F. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.
- H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.
- I. GANA - GANA Glazing Manual; Glass Association of North America; 2009.
- J. GANA - GANA Sealant Manual; Glass Association of North America; 2008.
- K. SIGMA TM-3000 - Glazing Guidelines for Sealed Insulating Glass Units; 2004.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene a pre-installation meeting at least two weeks before starting work of this Section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data:
 - 1. Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
 - 2. Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.
- C. Shop Drawings:
 - 1. Submit glazing schedule indicating all openings to be glazed and type of glazing.
- D. Samples:
 - 1. Upon request, submit 8x8 inch samples of glass units.

2. Submit 8x8 inch samples of films.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA Glazing Manual and FGMA Sealant Manual for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing the work of this Section with minimum five years documented experience.
- C. All heat strengthened, tempered and laminated glass shall be permanently labeled by such means as etching, sandblasting, firing of ceramic materials on the glass, or by other suitable means so as to be easily visible and legible. The label shall identify the nominal thickness, glass type and compliance with requirements of ANSI Z97.1 and with a certification label of the Safety Glazing Certification Council (SGCC) or other certifying agency acceptable to the Authority Having Jurisdiction.

1.07 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 50 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 - Project Close-out, for additional warranty requirements.
- B. Sealed Glass Units: Provide a ten (10) year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same. The warranty shall ensure that coatings will not crack, flake, peel or otherwise fail or degrade.

PART 2 PRODUCTS

2.01 INSULATING GLASS UNITS

- A. Type IG-1 - Sealed Insulating Glass Units: Vision glass, double glazed.
 1. Application: All exterior glazing unless otherwise indicated.
 2. Outboard Lite: Heat-strengthened float glass, or tempered glass where required by code or where indicated, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 - b. Coating: Low-E (passive type), on #2 surface.
 3. Inboard Lite: Annealed float glass or tempered glass where required by code or where indicated, 1/4 inch thick, minimum.
 - a. Tint: Clear.
 4. Total Thickness: 1 inch.
 5. Tempered Glass Applications: Provide this type of glazing in the following locations:
 - 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.
 - d. Other locations indicated on the Drawings.
 6. Performance Requirements:
 - a. Visible Light Transmittance (VLT): 70%, nominal.
 - b. Winter U Value: 0.25 max.
 - c. Summer U Value: 0.25 max.
 - d. Light to Solar Gain Ratio (LSG): 1.85
 - e. Solar Heat Gain Coefficient (SHGC): 0.38 percent, nominal.
 7. Glazing Method: Gasket glazing.
- B. Type SP-1 & SP-2 - Spandrel glazing.
 1. Application: Exterior glazing as a component of Insulated Solid Glazing Panels specified in this Section.

2. Outboard Lite: Heat-strengthened float glass and tempered glass where required by code or where indicated, 1/4 inch thick, minimum.
3. Tempered Glass Applications: Provide this type of glazing in the following locations:
 - 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.
 - d. Other locations indicated on the Drawings.
- C. Type S-1 - Single Vision Glazing: Non-fire-rated, fully tempered.
 1. Applications: All non-fire-rated interior glazing unless otherwise indicated.
 2. Types: Fully tempered.
 3. Tint: Clear.
 4. Thickness: 1/4 inch.

2.02 EXTERIOR GLAZING ASSEMBLIES

- A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with International Building code, 2009 edition.
 1. Wind Loads: See Structural Drawings.
 - a. Basic Wind Speed (3-second gust): 100 mph.
 - b. Wind Importance Factor: 1.15.
 - c. Building Category: III
 - D. Wind Exposure Category: B.
 - d. Horizontal Wind Pressures:
 - 1) Interior Zone: +28.5 psf; - 30 PSF.
 - 2) Exterior (Corner) Zone: +28.5 psf, - 51.5 PSF.
 2. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
 3. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery of glazing materials.
 4. Glass thicknesses listed are minimum.
- B. Thermal and Optical Performance: Provide glass products with performance properties specified above. Performance properties shall be manufacturer's published data as determined according to the following procedures:
 1. Center of glass U-Value: NFRC 100 methodology using LBNL WINDOW 5.2 computer program.
 2. Center of glass solar heat gain coefficient: NFRC 200 methodology using LBNL-35298 WINDOW 5.2 computer program.
 3. Solar optical properties: NFRC 300.
- C. Insulating Glass shall comply with ASTM D 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation. Unit shall be certified for compliance by the IGCC.
- D. Unit Overall Thickness Tolerance: - 1/16" / + 1/132".
- E. Comply with ASTM E546 Standard Test Method for Frost Point of Sealed Insulating Glass Units and ASTM E576 for insulating glass units in the vertical position.
- F. Insulating glass units shall be double sealed with a primary seal of polyisobutylene and a secondary seal of silicone.
 1. Minimum thickness of secondary seal: 1/16".
 2. Target width of primary seal: 5/32".
 3. No primary seal voids or skips allowed.
 4. Gaps or skips between the primary and secondary sealants are permitted to a maximum width of 1/16" by maximum length of 2" with gaps separated by at least 18". Continuous contact between the primary seal and the secondary seal shall be provided.
 5. Primary and secondary sealant adhesion shall exhibit continuous, tenacious adhesion to both glass and spacer contact areas.

- G. Lite spacer shall be a plastic hybrid stainless steel spacer or structural aluminum polyurethane thermal barrier spacer with three bent corners and one keyed-soldered corner or four bent corners and one straight key joint to provide a hermetically sealed and dehydrated space. Color as selected by the Architect.
 - 1. Products: TGI-Spacer by Technoform.
 - 2. Substitutions: See Section 01 60 00 - Product Requirements.
- H. Air and Vapor 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.
 - 2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.

2.03 GLASS MATERIALS

- A. Float Glass: All glazing shall be float glass unless otherwise indicated.
 - 1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
 - 2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
 - 3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.
 - 4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.
 - 5. Manufacturers:
 - a. AGC Glass Company North America, Inc.
 - b. Cardinal Glass Industries.
 - c. Guardian Industries Corp.
 - d. Pilkington North America Inc.
 - e. PPG Industries, Inc.

2.04 SEALED INSULATING GLASS UNITS

- A. Sealed Glass Assemblies Basis of Design:
 - 1. IG-1: Sunguard Super Neutral 68 on Clear Low-E (#2) and Sunguard IS-20 (#4); panels fabricated by Guardian Sunguard Advanced Architectural Glass.
- B. Acceptable Manufacturers:
 - 1. Cardinal Glass Industries.
 - 2. Viracon, Apogee Enterprises, Inc.
 - 3. PPG Industries, Inc.
 - 4. Substitutions: Refer to Section 01 60 00 - Product Requirements.

2.05 INSULATED SOLID GLAZING PANELS

- A. Type SP-1 & SP-2: Insulated Aluminum Glazing Panels: Opaque panels of balanced laminated construction; 1 inch thickness.
 - 1. Panel Surface:
 - a. Exterior surfaces: Exterior spandrel glass.
 - 1) SP-1: Warm Gray by Mapes Industries Inc
 - 2) SP-2: Subdued Gray by Mapes Industries Inc
 - b. Interior: Standard Kynar.
 - 1) Color: Selected by Architect from manufacturer standard.
 - 2. Adhesive: Manufacturer standard, permanently elastic type; neoprene or rubber base suitable for exterior use and covering 100% of the surfaces to be laminated.
 - 3. Panel Core Composition:
 - a. 1/4 inch Monolithic Spandrel Glazing by Mapes.
 - b. Isocyanurate foam, 5/8 inch minimum.
 - c. 1/8 inch corrugated high-density polyethylene. Corelite (HDPE) by Mapes.
 - 4. Thermal Performance: R 5.88.
 - 5. Seals against moisture intrusion as recommended by the manufacturer. Silicone based sealant with a 20 year life.

6. Basis of Design: Mapes-R Panels by Mapes Industries Inc.
 - a. Alternates:
 - 1) Nudo
7. Substitutions: See Section 01 60 00 - Product Requirements.

2.06 MISCELLANEOUS ACCESSORIES

- A. Miscellaneous Hardware: Provide all hardware required for intended glass applications.

2.07 GLAZING COMPOUNDS

- A. Glazing Compound: Elastic type.
 1. Bostik Inc.
 2. Momentive Performance Materials, Inc.
 3. Pecora Corporation.
 4. BASF Construction Chemicals-Building Systems.
 5. DAP Inc.
 6. Dow.
 7. Substitutions: Refer to Section 01 60 00 - Product Requirements.

2.08 GLAZING ACCESSORIES

- A. Glazing Materials: Select glazing compounds, sealants, tapes, gaskets and additional glazing materials of proven compatibility with other materials they will contact, including glass products, seals of insulating glass units and glazing channel substrates, under conditions of installation and service, as demonstrated by testing and field experience.
- B. 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; cured Shore A hardness of 15 to 25.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within tolerance. Glass sizes indicated on the Drawings are approximate only.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. All frames shall be checked prior to glazing to make certain openings are square, plumb and secure in order that uniform face and edge clearances are maintained.
- C. Prime surfaces scheduled to receive sealant.
- D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
- E. Install sealant in accordance with manufacturer's instructions.

3.03 GLAZING METHODS

- A. All glazing shall be performed in accordance with standards of FGMA, AAMA and SIGMA, latest editions. Glass clearance dimensions shall be based on the type and thickness of the glass as determined by the FGMA Glazing Manual, or as hereinafter specified.
- B. No glass shall be installed where it may be damaged unless it is properly protected at all times. Any damaged or defective glass shall be removed and replaced with new perfect glass at no additional cost to the Owner.

3.04 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)

- A. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.

- B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.
- C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.05 INSTALLATION - INTERIOR DRY METHOD (TAPE AND TAPE)

- A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- C. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
- D. Place glazing tape on free perimeter of glazing in same manner described above.
- E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- F. Knife trim protruding tape.

3.06 INSTALLATION - INTERIOR WET/DRY METHOD (TAPE AND SEALANT)

- A. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
- C. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- D. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- E. Fill gaps between pane and applied stop with appropriate sealant to depth equal to bite on glazing, to uniform and level line.
- F. Trim protruding tape edge.

3.07 INSULATED SOLID GLAZING PANELS

- A. Panels shall be installed into frames in strict accordance with the manufacturer's instructions and recommendations. Provide a continuous bed of sealant around all edges, preventing moisture contact with panel edges.

3.08 CLEANING

- A. Remove glazing materials from finish surfaces. Remove labels after Work is complete. Clean glass and adjacent surfaces.

END OF SECTION

SECTION 08 91 00
LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Louvers, frames, and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 06 10 54 - Wood Blocking and Curbing.
- B. Section 07 25 00 - Weather Barriers: Sealing frames to weather barrier installed on adjacent construction.
- C. Division 23 - Mechanical.

1.03 REFERENCE STANDARDS

- A. AMCA 511 - Certified Ratings Program Product Rating Manual for Air Control Devices; 2013.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.
- C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.
- D. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum fifteen years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wall Louvers:
 - 1. Exterior Applications: (Basis of Design) Ruskin Company; Louver Type ELF6425DD
- B. Alternate Manufacturers:
 - 1. Construction Specialties, Inc.
 - 2. Nystrom, Inc.
 - 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LOUVERS

- A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
 - 1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf (100 MPH) without damage or permanent deformation.
 - 2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
 - 3. Screens: Provide bird screens at all louvers.
 - 4. Assembly Size: Match existing unless specified otherwise per the Drawings.
 - a. Field verify existing exterior louvers indicated to be replaced. Submit field verified schedule indicating existing sizes during the submittal process for review.

- B. Stationary Louvers: Horizontal blade, formed galvanized steel sheet construction, with intermediate mullions matching frame.
 - 1. Exterior Aluminum Louvers:
 - a. Free Area: 51 percent, minimum.
 - b. Blades: V-shaped, sight-proof.
 - c. Frame: 6 inches deep, channel profile; corner joints mitered and, with continuous recessed caulking channel each side.
 - d. Aluminum Thickness: Frame 13 gage, 0.081 inch minimum base metal; blades 13 gage, 0.094 inch minimum base metal.
 - e. Steel Finish: Selected by architect from manufacturer full standard.

2.03 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), Alloy 6063-T5.

2.04 FINISHES

- A. Finish: 70 percent PVDF: Finish shall be applied at 1.2 mil total dry film thickness.
 - 1. Coating shall conform to AAMA 2605. Apply coating following cleaning and pretreatment. Cleaning: AA-C12C42R1X.
 - a. Standard 2-coat.
 - 2. Warranty: Manufacturer standard 20 years.

2.05 ACCESSORIES

- A. Bird Screen: Interwoven wire mesh of steel, 14 gage, 0.0641 inch diameter wire, 1/2 inch open weave, diagonal design.
 - 1. Applications: Exterior louvers only.
 - 2. Frame: Removable and rewirable.
- B. Fasteners and Anchors: Stainless steel.
- C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.
- D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that prepared openings and flashings are ready to receive work and opening dimensions are as indicated on shop drawings.

3.02 INSTALLATION

- A. Install louver assembly in accordance with manufacturer's instructions.
- B. Coordinate with installation of flashings by others.
- C. Install louvers level and plumb.
- D. Set sill members and sill flashing in continuous bead of sealant.
- E. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
- F. Secure louver frames in openings with concealed fasteners.
- G. Coordinate with installation of mechanical ductwork.

3.03 CLEANING

- A. Strip protective finish coverings.
- B. Clean surfaces and components.

END OF SECTION

SECTION 09 05 61
COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preparation of new concrete floor slabs for installation of floor coverings.
- b. Testing of concrete floor slabs for moisture and pH.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements.
- B. Section 03 30 00 - Cast-in-Place Concrete: Restrictions on curing compounds and finish for concrete slabs to receive finish flooring.
- C. Section 12 48 13 – Entrance Floor Mats.

1.03 REFERENCES

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- B. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2011.
- F. RFCI - Recommended Work Practices for Removal of Resilient Floor Coverings; 2011.

1.04 SUBMITTALS

- A. Product Data: Floor covering and adhesive manufacturers' product data for each specific combination of substrate, floor covering, and adhesive to be used, submit:
 - 1. Manufacturer's recommended slab moisture and pH limits.
 - 2. Manufacturer's required bond/compatibility test procedure.
- B. Field Reports:
 - 1. Submit visual observation report for existing floor coverings to be removed.
 - 2. Submit contractor's field adhesive bond and compatibility test results.

1.05 QUALITY ASSURANCE

- A. Moisture and pH testing shall be performed by an independent testing agency employed and paid for by Owner.
- B. Contractor may perform adhesive and bond test with his own personnel or hire a testing agency.
- C. Contractor's Responsibility Relating to Independent Agency Testing:
 - 1. Provide access for and cooperate with testing agency.
 - 2. Confirm date of start of testing at least 10 days prior to actual start.
 - 3. Allow at least 4 business days on site for testing agency activities.
 - 4. Achieve and maintain specified ambient conditions.
 - 5. Notify Owner when specified ambient conditions have been achieved and when testing will start.
- D. Applicator Qualifications: Companies specializing in performing the work of this Section with minimum five years of experience and approved by the manufacturer.

1.06 PRE-INSTALLATION MEETING

- A. Convene a pre-installation meeting after the results of slab testing are available and at least two weeks before starting finish flooring installation; require attendance by the Contractor, a technical representative from each flooring manufacturer, flooring installer, Architect and Owner, to review slab moisture levels, floor surface conditions and preparation requirements, materials, installation procedures and coordination of related work.

1. A field report summarizing the findings and recommendations from this meeting shall be issued by the technical representatives and copied to the Owner and Architect.
2. Written certification from each flooring manufacturer that condition of sub-floor is acceptable for flooring installation shall be issued and copied to the Owner and Architect.
3. If a slab moisture sealer or other remedial work is required to make the condition of the sub-floor acceptable for the flooring installation, such measures shall be reviewed with the manufacturer's technical representatives and the Contractor shall be instructed to procure pricing.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, handle, and protect products in accordance with manufacturer's instructions and recommendations.
- B. Deliver materials in manufacturer's packaging; include installation instructions.
- C. Keep materials from freezing.

1.08 FIELD CONDITIONS

- A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F or more than 85 degrees F.
- B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Patching Compounds: Cementitious type recommended by adhesive material manufacturer and flooring manufacturer. Calcium sulphate, plaster or gypsum based toppings, leveling and patching compounds are not acceptable.
 1. Product:
 - a. K-15 by Ardex. (Slope / Build-up Product: SD-P by Ardex).
 - b. Drytek Premium Skimcoat Patch Underlayment with Primer by Laticrete.
 - c. Substitutions: See Section 01 60 00 – Product Requirements.
- B. Self-leveling Cementitious Underlayment: Portland cement-based self-leveling underlayment.
 1. Substrate preparation and conditions shall be reviewed and confirmed with the manufacturer's technical representative prior to installation.
 2. Slab primer as recommended by the underlayment manufacturer.
 3. Products:
 - a. K-15 by Ardex.
 - b. Premium Self-Levelign Underlayment by Loster American Corp.
 - c. Supercap by Laticrete.
 - d. Substitutions: See Section 01 60 00 – Product Requirements.

PART 3 EXECUTION

3.01 CONCRETE SLAB PREPARATION AND TESTING

- A. Perform following operations in the order indicated:
 1. Visual observation of floor slab for adhesion, water damage, alkaline deposits, and other defects.
 2. Preliminary cleaning for all slabs.
- B. Owner's testing agency shall test concrete slab surfaces. Test results shall be made available to the contractor for determination of acceptability by the flooring and adhesives manufacturers. Contractor shall obtain instructions from flooring manufacturers if test results are not within their recommendation limits. Testing shall include:
 1. Internal relative humidity rates per ASTM F2170
 2. Alkalinity, pH rates per ASTM 710.

- C. Contractor shall verify that concrete slabs conforms to ASTM F710. Perform adhesive bond tests and water absorption tests.
- D. Testing Agency's Report: Include description of areas tested; include floor plans and photographs if helpful; summary of conditions encountered; copies of specified test methods; certification of accuracy by authorized official of testing agency; and:
 - 1. Moisture and pH test reports.
 - 2. Recommendations for remediation of unsatisfactory surfaces.
 - 3. Submit report directly to Owner not more than two business days after conclusion of testing.
- E. Subfloor surfaces shall not vary more than plus or minus 1/8" in any 10' dimension. Neither shall they vary at a rate greater than 1/16" per running foot. Leveling compound shall be used for larger areas. For subfloor surfaces intended to slope to floor drains, build-up product shall be installed precisely to create proper pitch. Floor pitch shall be laser verified with results submitted to the Architect and Owner.
- F. Any conditions that could adversely affect the flooring installation shall be corrected, prior to proceeding with the Work. Commencement of the installation of flooring shall be considered acceptance of the concrete slab as being suitable for the intended application. Any conditions that could adversely affect the flooring installation shall be brought to the Contractor's attention, for resolution, prior to proceeding with the Work.

3.02 SUBSTRATE PREPARATION

- A. Clean floors of dust, solvents, paint, wax, oil, grease, asphalt, residual adhesive, adhesive removers, film-forming curing compounds, sealing compounds, alkaline salts, excessive laitance, mold, mildew, and other materials that might prevent adhesive bond. Do not use solvents or other chemicals for cleaning. Do not fill expansion joints or other moving joints.
- B. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate. Verify slab substrates conform to ASTM F710.
- C. Subfloor surfaces shall not vary more than plus or minus 1/8" in any 10' dimension. Neither shall they vary at a rate greater than 1/16" per running foot. Leveling compound shall be used for larger areas and for floor areas to receive large format ceramic tile.
 - 1. For subfloor surfaces intended to slope to floor drains, build-up product shall be installed precisely to create proper pitch. Floor pitch shall be laser verified with results submitted to the Architect and Owner.
 - 2. Substrate surface pitch shall be confirmed with a laser level for conformance to pitch requirements. Report results to Architect and Owner.
- D. Prepare subfloor surfaces as recommended by flooring and adhesive manufacturers.
- E. Any conditions that could adversely affect the flooring installation shall be corrected, prior to proceeding with the Work. Commencement of the installation of flooring shall be considered acceptance of the concrete slab as being suitable for the intended application. Any conditions that could adversely affect the flooring installation shall be brought to the Contractor's attention, for resolution, prior to proceeding with the Work.
- E. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor patching compound to achieve smooth, flat, hard surface. Provide transition strips directly over construction joints between new and existing floor slabs where applicable.

3.02 UNDERLAYMENT PREPARATION & INSTALLATION

- A. Concrete: Mechanically prepare steel troweled concrete to create a textured surface necessary to achieve the best bond; acceptable methods include bead blasting and scarifying. Do not use acid etching.

- B. Vacuum clean surfaces. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- C. Install products in accordance with manufacturer's instructions.
- D. Once underlayment starts to set, prohibit foot traffic until final set has been reached.

END OF SECTION

SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Performance criteria for gypsum board assemblies.
- B. Interior metal stud wall framing.
- C. Ceiling and soffit framing.
- D. Acoustic Construction, including installation of acoustic insulation and sealing of joints at framing and gypsum board.
- E. Marking and identification of fire-rated assemblies.
- F. Joint treatment, expansion and control joints and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 05 40 00 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing and exterior sheathing.
- B. Section 06 10 54 - Wood Blocking and Curbing: Wood blocking for support of wall-mounted equipment.
- C. Section 07 21 00 - Thermal Insulation: Acoustic batt insulation in stud walls and mineral fiber batt insulation at tops of partitions.
- D. Section 07 84 00 - Firestopping: Top-of-wall assemblies at fire rated walls.
- E. Section 07 90 05 - Joint Sealants: Sealants.

1.03 REFERENCE STANDARDS

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.
- B. ANSI S200 - North American Standard for Cold-Formed Steel Framing - General Provisions.
- C. ANSI A108.11 - American National Standard for Interior Installation of Cementitious Backer Units; 2010 (Revised).
- D. ANSI A118.9 - American National Standard Specifications for Test Methods and Specifications for Cementitious Backer Units; 2010.
- E. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2011.
- F. ASTM A1003 - Standard Specification for Steel Sheet, Carbon, Metallic-Coated and Nonmetallic-Coated for Cold-Formed Framing Members; 2005.
- G. ASTM C475 - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2007.
- H. ASTM C 645 - Standard Specification for Nonstructural Steel Framing Members; 2008.
- I. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2011.
- J. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- K. 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; 2011.
- L. 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; 2014.

- M. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- N. ASTM C1396- Standard Specification for Gypsum Board; 2011.
- O. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- P. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009.
- Q. ASTM E413 - Classification for Rating Sound Insulation; 2010.
- R. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2013.
- S. GA-600 - Fire Resistance Design Manual; Gypsum Association; 2012.
- T. ICC - International Building Code; 2009.
- U. UL - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data:
 - 1. Provide data on metal framing, runners, head tracks, shaftwall assemblies, gypsum board, accessories, and joint finishing systems.
 - 2. Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- C. Shop Drawings:
 - 1. Submit fully engineered shop drawings for all partitions which shall accommodate lateral and required special loading conditions specified herein. Submit design criteria, calculations, size and thickness designations, type, location, spacing, connection to building structure, supplemental bracing or accessories, fasteners and details required for proper installation. All shop drawings shall bear the seal of the licensed structural engineer licensed employed by the gypsum board assemblies subcontractor, licensed to practice in New Hampshire.
 - a. Provide calculations for loadings and stresses of all framing that bear the seal of the licensed structural engineer.
 - 2. Submit color coded floor plans with partition colors keyed to stud manufacturer's color coding system indicating extents of each stud / partition assembly type.
 - 3. Submit details associated with fire-rated partition head tracks coordinated with Section 07 84 00 - Firestopping, products submittal.
- D. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.
- E. Samples: Upon request, submit samples of all materials and accessories.

1.05 QUALITY ASSURANCE

- A. Panel Products and Finishing Manufacturer: Unless otherwise indicated, gypsum board and other panel products, accessories and finishing materials shall be from a single manufacturer.
- B. Metal Framing Manufacturer: Unless otherwise indicated, steel framing for gypsum board assemblies shall be from a single manufacturer.
- C. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 5 years of documented experience.
- D. Framing components and assemblies required to be engineered and detailed on shop drawings shall include proper accommodations for all live and dead loads, differential building movement, etc. Provide industry standard safety factors as suited to specific job conditions. To the extent that component types and sizes are indicated in the Contract Documents, they shall be considered minimum requirements to be verified and increased (but not decreased) as

determined to be necessary by the metal stud contractor's engineer. Framing member depths indicated on the Drawings shall not be altered without the Architect's prior written authorization.

- E. All procedures and workmanship shall be in accordance with Gypsum Association GA-216 "Application and Finishing of Gypsum Board" and Gypsum Association Specifications for the Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.

1.06 PRE-INSTALLATION MEETING

- A. At least 3 weeks prior to start of installation of metal framing systems, meet at the Project site with installers of other work including door and window frames, mechanical and electrical work. Review areas of potential interference and conflicts, coordinate layout, and support provisions for interfacing work.

1.07 DELIVERY, STORAGE AND HANDLING

- A. All materials shall be delivered to the job site in their original unopened containers or bundles, stored flat under conditions providing adequate protection from damage and exposure to elements and adequately protected from foul weather conditions.
- B. Steel framing and related accessories shall be stored and handled in accordance with AISI Code of Standard Practice.
- C. All fire-rated materials shall bear testing agency labels and required classification numbers.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216. See PART 3 for finishing requirements.
- B. Interior Partitions, Indicated as Acoustic: Provide completed assemblies with STC ratings as indicated on the Drawings, calculated in accordance with ASTM E413 by a qualified independent testing agency, based on tests conducted in accordance with ASTM E90.
- C. Fire Rated Assemblies: Provide complete assemblies as indicated on the Drawings. Materials and construction shall be identical to assemblies whose fire resistance rating has been determined per ASTM E119 by a testing and inspection service acceptable to the Authority Having Jurisdiction. Materials provided shall meet or exceed flame, fuel and smoke requirements of ASTM E84 surface burning characteristics for finish materials.
 - 1. UL Assembly Numbers: Comply with requirements listed for each particular assembly. See tested assemblies appended to the end of this Section.
- D. Design Requirements:
 - 1. Steel stud maximum spacing: 16 inches on center.
 - 2. Steel stud lateral deflection for partitions:
 - a. Typical gypsum board faced partitions: L/240.
 - 3. Steel stud vertical deflection for soffits and ceilings:
 - a. Typical gypsum board facing: L/240.
 - 4. Steel stud uniform lateral loads for partitions:
 - a. Typical gypsum board faced partitions: 5 PSF.
 - 5. Steel stud special loads in addition to uniform lateral loads for partitions:
 - a. Wall supported gypsum board framed ceiling: Ceiling dead load of 7 PSF.
 - b. Wall mounted monitors: Minimum concentrated force of 60 pounds applied at any point in any direction 8" from the face of the wall.
 - c. Maintenance load for horizontal soffit shelves: 40 PSF

2.02 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. Dietrich Metal Framing.
 - 2. Marino\Ware.
 - 3. EB Metals.

4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Framing System Components: ASTM C645, roll-formed steel.
 1. Protective Coating: ASTM A653 minimum G60 (Z180) hot-dip galvanized corrosion resistant coating.
 2. Sizes: Sizes and properties necessary to comply with ASTM C754 and for the spacing, deflection and load conditions indicated, but in no case less than 18 mils (0.0179 inches) minimum thickness.
 3. Studs: C shaped with flat or formed webs, 1-1/4" legs (flanges) with knurled faces; web depths as indicated on the Drawings.
 4. Studs for heights exceeding C shaped formed web type stud capabilities: ASTM A1003 sheet steel, structural grade, Type H; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height. Thickness as required to meet specified performance levels, but in no case less than 43 mils thickness. Stud spacing shall not exceed 16 inches on center. Coating shall be ASTM A653 G60/Z180.
 5. Runners: U shaped, sized to match studs.
 6. Furring Channels: Hat-shaped sections, depth of 7/8 inch with 1/2 inch wide flanges; 22 gage (0.269 inch).
- C. Ceiling and Soffit Suspension Systems: Comply with ASTM C754.
 1. Flat and Rod Steel Hangers: Zinc coated sheet steel; type and size as specified in ASTM C754 for spacing required; minimum flats size 1 inch x 3/16 inch by length required.
 2. Wire Hangers: ASTM A641, Class 1 zinc coating, soft temper, sized for the specific application, but in no case less than 0.162 inch diameter.
 3. Anchorage Devices: Corrosion resistant screws, clips, bolts, power-actuated fasteners compatible with support substrates, whose suitability has been proven through standard construction practices or by certified test data. Fasteners shall be capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E488.
 4. Framing System:
 - a. Main Runners: Cold-rolled, C shaped steel channels, 16 gauge min. Galvanized with G40 hot-dip coating per ASTM A525.
 - b. Cross Furring: Hat-shaped steel furring channels, ASTM C645; 7/8 inch high, 25 gauge galvanized.
 - c. Furring Anchorages: ASTM C754; 16 gauge galvanized wire ties, manufacturer's standard wire-type clips, bolts, nails or screws as recommended by furring manufacturer.
 - d. Provide compression posts and other accessories as required to comply with seismic requirements.
 5. Alternate Proprietary Framing System:
 - a. Main and Cross Tees: Heavy duty classification 1-1/2" high integral reversible splice with knurled face. Cross tees 1-1/2" high with 1-1/2" wide face; quick release cross tees for positive locking and removability.
 - b. Provide all necessary accessories, splice clips, compression posts and moldings.
 - c. Exposed framing members shall be finished with manufacturer's standard enamel paint finish.
 - d. System Deflection Criteria: L/360 maximum.
 - e. Products:
 - 1) USG Drywall Suspension System.
 - 2) Drywall Furring System by Armstrong World Industries, Inc.
- D. Partition Head To Structure Connections (Deflection Head Tracks) Non-fire Rated:
 1. Primary steel deflection is 1 inch and secondary steel (bar joist) deflection is 1-5/8 inches. Movement joints with sealant shall accommodate the 50% movement ability of sealant, thereby setting the deflection gap at joints with sealant at primary steel 2 inches and at secondary steel (bar joist) 3-1/4 inches.

2. Provide track fastened to structure with legs of sufficient length to accommodate movement required, for friction fit of studs cut short and fastened as determined by the fabricator/installer's engineering. In no case shall tracks be less than 33 mils; ASTM C653 sheet steel, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating. Options include:
 - a. Single Long-Leg Runner System: Leg depth and gage as required by engineering but in no case shall gage be less than stud gage, installed with studs friction fit into top runner, with continuous bridging located within 12 inches of the top of studs or other mechanical anchorage to allow vertical movement but prevent rotation of studs while maintaining structural performance of the partition.
 - b. Double-Runner System: Leg depth and gage as required by engineering and fastened to studs, with an outer runner sized to friction fit inside runner and in gage as required by engineering but not less than stud gage.
- E. Partition Head to Structure Connections (Deflection Head Tracks) Fire Rated:
 1. Primary steel deflection is 1 inch and secondary steel (bar joist) deflection is 1-5/8 inches.
 2. For fire rated assemblies:
 - a. Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and/or anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
 - b. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, evaluated in accordance with AISI SG02-1.
 - c. Material: ASTM A653 steel sheet, SS Grade 50/340, with G60/Z180 hot dipped galvanized coating.
 - d. Provide components UL-listed for use in UL-listed fire-rated head of partition joint systems of fire rating and movement required.
 - e. Deflection and Firestop Track:
 - 1) Products:
 - a) Fire Trak by Fire Trak Corp (for movement < 2")
 - b) Blaze Frame DSL Series by Clark Dietrich (for movement 1/2" to 1-1/2")
 - c) Substitutions: See Section 01 60 00 - Product Requirements.

2.03 BOARD MATERIALS

- A. Gypsum Wallboard: ASTM C1396, 5/8" thickness, Type X paper-faced gypsum panels; sizes to minimize joints in place; ends square cut.
 1. Applications: Use for vertical surfaces and ceilings, unless otherwise indicated.
 2. Provide 1/2" thicknesses where indicated per the Drawings.
 3. Products:
 - a. ProRoc Brand Gypsum Board by Certain Teed Corp.
 - b. ToughRock Fireguard X by G-P.
 - c. Gold Bond Brand Gypsum Wallboard by National Gypsum Co.
 - d. Sheetrock Brand Gypsum Panels by USG Corp.

2.04 ACCESSORIES

- A. Acoustic Insulation and Insulation at Partition Tops: As specified in Section 07 21 00.
- B. Acoustic and Smoke Sealant: As specified in Section 07 90 05.
- C. Firestopping: As specified in Section 07 84 00.
- D. Finishing Accessories for Wallboard: ASTM C1047, galvanized steel or rolled zinc, not less than 26 gage, unless otherwise indicated.
 1. General Types: As detailed or required for finished appearance.
 2. "J" Beads: Channel shaped with a concealed wing not less than 1-1/8" wide and an exposed wing, equal to Type 400. "J" beads may be used only where specifically identified on the Drawings or otherwise approved by the Architect. All other edge trim shall be Casing Beads.

3. Casing and Trim Beads: Channel and angle types as required, screwed into place and suitable for finishing with joint compound, equal to Type 200.
 - a. Vinyl Rip Bead L Trim is acceptable.
4. Corner Beads: Angle-shaped with 1-1/4" width wings, and perforated for screwing and joint treatment, equal to Type 103. Use Multi-Flex, steel reinforced, tape bead for corners less than or greater than ninety degrees.
5. Edge Beads: (For use at perimeter of ceilings) Channel or angle-shaped with wings not less than 3/4" wide. Exposed wing edge shall be folded flat, with bead for taping and floating, equal to Type 200.
6. Control Joints: Zinc extrusions equal to Type 093, or deep rigid PV extrusions equal to Type 093V by Trimtex for larger joints.
7. Miscellaneous Shapes: In addition to conventional cornerbead and control joints, provide other configurations indicated or as otherwise required for a complete and proper job. At exterior locations provide exterior grade rigid PVC trims.
8. Products:
 - a. Same manufacturer as framing materials, unless otherwise specified.
- E. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
 1. Tape: 2 inch wide, creased paper tape for joints and corners for all interior locations.
 2. Ready-mixed vinyl-based joint compound.
- F. High Build Drywall Surfer: Vinyl acrylic latex-based coating for spray application, designed to take the place of skim coating and separate paint primer in achieving Level 5 finish for semi-gloss painted surfaces.
- G. Screws for gypsum board attachment to Steel Members Less Than 0.03 inch In thickness; to Wood Members; ASTM C1002; self-piercing tapping type, Type W for wood studs and Type S for steel studs, 1-1/4" length.
 1. Coatings: Black oxide coated for general use; Zinc plated chromate for areas of potential dampness.
- H. Screws for gypsum board attachment to Steel Members From 0.033 to 0.112 Inch in thickness: ASTM C 954; steel drill screws for application of gypsum board to loadbearing steel studs.
 1. Size, penetration and spacing shall be in strict accordance with the stud manufacturer's recommendations and the stud fabricator's engineering requirements. Penetration through joined steel materials shall not be less than 3 exposed threads or 3/8".
 2. Coatings:
 - a. General interior areas: Corrosion resistant, zinc plated with chromate complying with ASTM B633 and B117.
 - b. Potentially damp interior areas: High performance polymer coating, complying with ASTM B117; salt spray test result of no rust or other base metal corrosion after a minimum of 800 hours.
- I. Anchorage to Substrate: Anchorage of tracks to the structure (size, penetration, type and spacing) shall be in strict accordance with the stud fabricator/installer's engineering requirements for the specific application and shall rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this Section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Comply with ASTM C754, fabricator's engineering drawings and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated and in accordance with fabricator's engineering drawings. Suspend carrying channels from structure

above at not more than 4 feet on center and within 6 inches of walls. Attach furring channels to the carrying channels at no more than 16 inches on center and within 2 inches of walls.

1. Level ceiling system to a tolerance of 1/8" in 12'.
 2. Install hangers plumb and free of contact with other objects that are not part of the supporting system for the ceiling. Install supplemental suspension members where width of ducts or other construction interferes with hanger locations.
 3. Provide control and expansion joints as indicated on the Drawings, or otherwise required.
 4. Laterally brace entire suspension system. Reinforce openings in suspension system which interrupt main carrying channels or furring channels with lateral channel bracing. Extend bracing a minimum of 24 inches past each opening.
 5. NOTE: At the Contractor's option, drywall direct suspension systems may be used, in lieu of the carrying/furring channel system, subject to review and acceptance by the Architect. Direct (proprietary) suspension systems shall be complete with main beams, cross channels, wall angles, clips, and hangers, and shall be as recommended by the gypsum board manufacturer for the proposed installations. Systems shall be suitable for fire-rated installations as required.
 6. Fasteners for hanger wires shall be of types and sizes that will resist corrosion, and provide lasting anchorage without pullout or failure. Verify compatibility with structure to receive fasteners prior to proceeding. Do not attach hangers to steel roof deck or steel deck tabs.
- C. Runner Tracks: Install continuous tracks sized to match stud, aligned accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer and engineered design for type of construction involved.
- D. Studs: Space studs at 16 inches on center unless closer spacing is required by the fabricator's engineering. Spacing shall not exceed 16 inches without the Architect's prior written authorization.
1. Extend partition framing to structure in all locations.
 2. Partitions Terminating at Structure: Provide deflection head track at all locations where metal framing is attached to or otherwise affected by the deflection of other structural building components. Secure the top of studs in such a way as to allow movement of the deflection head track with respect to the studs. Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging, or as otherwise required by the fabricator's engineering drawings.
 3. Provide minimum clear space as indicated on the partition types on the Drawings for deflection.
- E. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs of all window and door openings and shall be located not more than 2 inches from frames jambs. Two jamb studs shall be used for any opening larger than 2 feet square. Over door frames install a cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs and securely screw-attached to adjacent studs. A cut-to-length stud extending from door frame header to ceiling runner shall be positioned over the door frame.
1. Provide additional framing as required by engineered design to reinforce headers for adequate stability.
 2. Unless otherwise indicated on the Drawings, partitions above and below door and window openings shall be the same construction as adjacent partitions.
- F. Blocking: As part of the scope of Section 06 10 54 - Wood Blocking and Curbing, install wood blocking for support of:
1. Framed openings.
- G. Supplemental Framing: Install supplementary framing, blocking and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the walls or partitions. Where type of supplementary support is not otherwise indicated by the engineered

design, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported, for firm and rigid construction.

- H. Penetration and Opening Insulation: Install firesafing insulation as required to meet firestop product manufacturer's tested assemblies for all openings and penetrations in fire-rated construction, smoke partitions and at acoustic sealing. Openings shall include steel deck flutes, structural penetrations, mechanical, electrical, piping, etc. Provide any necessary extra studs, furring channels or stick-clips to ensure that insulation will remain in proper alignment and fit around items penetrating partitions.
- I. Expansion and Control Joints: Provide studs at each side of all horizontal and vertical joints. Space studs to align with width of joints. Stuff voids between studs full with firesafing insulation at all locations.
- J. Fire-resistive Wall and Ceiling Assemblies: Where fire-rated assemblies are required, provide materials and construction identical to the Underwriters Laboratories (U.L.) tested assemblies as referenced on the Drawings.

3.04 ACOUSTICAL CONSTRUCTION

- A. The following requirements shall apply to all non-fire rated ceilings and partitions indicated on the Drawings to be "Acoustical Construction". Special attention shall be paid to the proper installation of acoustical construction components.
- B. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions. Prior to installation of gypsum board, verify that acoustical insulation is in place and secure, completely filling all voids.
- C. Acoustic Sealant (at non-fire-rated construction): Install in accordance with manufacturer's instructions. Seal all cracks, joints, deck flutes, piping, conduit, duct penetrations and voids in "Acoustical Construction" air tight with sound sealing products. See Section 07 91 05 for products.
 - 1. Place continuous bead at perimeter of each layer of gypsum board.
 - 2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.
- D. At partition heads, install mineral fiber insulation in all voids at deck flutes and deflection head tracks which will act as backer for acoustic sealant. Top of partition joints to building structure are high movement joints and shall be sealed in accordance with Section 07 91 05 - Sealants.

3.05 BOARD INSTALLATION

- A. General: Inspect materials to which gypsum board is to be applied. Remedy all defects prior to installation of gypsum materials. Maintain a uniform room temperature between 55 and 65 degrees F during application and until completely dry or occupied. Provide adequate ventilation to carry off excess moisture.
- B. Field verify the layout of all walls and partitions prior to proceeding with the Work, in order to avoid dimensional errors and confirm proper placement. Verify that all required insulations are properly in place prior to covering up.
- C. Where the Drawings indicate multiple partition or wall types back-to-back, each scheduled type shall be complete. Inner layers of insulation or gypsum board shall not be omitted.
- D. Comply with ASTM C840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
 - 1. Gypsum wallboard shall be cut by scoring and breaking, or by sawing, working from the face side. Scribe neatly to projecting surfaces and fit wallboard neatly around pipes, ducts and other penetrations.
 - 2. Apply wallboard first to soffits (ceilings) then to walls. Allow 1/4" maximum space between bottom of wall sheets and floor, unless otherwise noted. Apply wallboard at interior soffits with long dimensions of board perpendicular to axis of supports.

3. At ductwork and piping provide a 1/2 inch gap between the drywall and the penetrating element to minimize any vibrational noise transmission to the partition. Void shall be acoustically sealed.
- E. Single-Layer Non-Rated: Install gypsum board perpendicular to framing, with ends and edges occurring over firm bearing.
- F. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.
- G. Fastening Gypsum Wall and Soffit Board: Wallboard shall be held in firm contact with the supports while the fasteners are being driven. Fasteners shall proceed from central portion of board towards ends and edges. Fasteners shall be driven home with the heads slightly below the surface of the board in a dimple formed by the driving tool. Care shall be taken to avoid breaking the paper face. Improperly driven fasteners shall be removed.
 1. In general, drywall screws shall be spaced not to exceed 16 inches o.c. At fire-resistive construction, space screws 12 inches o.c. in field and 8 inches o.c. at board perimeters, unless otherwise required by the applicable U. L. fire-rated assembly.
- H. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.06 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces, as recommended by the gypsum board manufacturer, and as indicated. Locations not indicated on the Drawings shall be located by the Contractor subject to the Architect's prior approval. Provide control joints or expansion joints where partitions, walls, ceilings, or soffits cross construction or building joints in stud framing or other supporting materials.
 1. At building expansion joints,
 2. At intersections of dissimilar substrates or finish materials,
 3. At floor lines,
 4. At ceiling and soffit intersections with a structural element or the vertical penetration,
 5. At ceiling wings of "L", "U" and "T" shaped ceiling areas,
 6. At openings more than 6 feet long,
 7. Adjacent to corners and intersections of walls within a distance equal to half the general control joint spacing noted above.
 8. At walls not more than 30 feet apart and ceilings over 30 feet long without relief,
 9. At locations where concentrated stress or movement is anticipated,
 10. At all locations identified on the Drawings,
 11. At locations as recommended by the board manufacturer.
- B. Control joint width shall be as required to accommodate anticipated movement.
- C. Control joint in fire-rated construction shall meet requirements of the fire-resistive tested assemblies.
- D. Wall boards shall be discontinuous at the joint, sealant shall fill the gap and control joint trim shall be fastened at both flanges along the entire length of the joint.
- E. Corner Beads: Install with screws at external corners, using longest practical lengths.
- F. Casing Beads: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.07 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:

1. Level 5: Walls and ceilings to receive semi-gloss paint finish and other areas specifically indicated.
 2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 3. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish.
 4. Level 1: Wall areas above finished ceilings and in attics, whether or not accessible in the completed construction.
 5. Level 0: Temporary partitions.
- C. 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 is not required at base layer of double layer applications, except as required in fire-rated applications.
- D. All wallboard in fire-rated and smoke sealed construction shall be sealed when penetrated by pipes, conduits, wire, structure, etc.
1. Smoke sealed assemblies shall be sealed tight to abutting construction with sealant products.
 2. Fire-rated assemblies shall be sealed tight to abutting construction with firestopping products in order to provide continuous, uninterrupted fire protection.
- E. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.08 MARKING OF FIRE AND SMOKE RESISTIVE CONSTRUCTION

- A. Prepare stenciled signs for painted marking of all fire walls, fire barriers and smoke partitions as indicated on the Code Analysis Drawings, above accessible ceilings, in attics and in accessible concealed floor spaces, at intervals not exceeding ten (10) feet measured horizontally.
1. Lettering shall be 3 inches high, of contrasting color to the application surface.
 2. Sign text shall be as follows, as applicable:
 - a. FIRE WALL - PROTECT ALL OPENINGS
 - b. FIRE BARRIER - PROTECT ALL OPENINGS
 - c. SMOKE PARTITION - PROTECT ALL OPENINGS

3.09 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 30 00
TILING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Floor tile.
- B. Patching ceramic tile to match existing adjacent surfaces.
- C. Accessories and trim.
- D. Note: The intent of this scope of work for floor tile is to match the existing Lobby 101 floor tile into the Lobby addition and into room Interview 102. All floor tile shall be laid in matching and aligning pattern to existing flooring. Tile shall not be ordered until final samples have been approved by the Architect.

1.02 RELATED REQUIREMENTS

- A. Section 01 23 00 - Alternates.
- B. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- C. Section 09 05 61 - Common Work Results for Flooring Preparation.

1.03 REFERENCE STANDARDS

- A. ANSI A108 Series / A118 Series / A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium) ; 2012.1.
- B. ASTM C1178 - Standard Specification for Coated Glass Mat Water-Resistant Gypsum Backing Panel; 2011.
- C. TCNA - Handbook for Ceramic, Glass, and Stone Tile Installation ; 2012.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Pre-installation Meeting: Convene a pre-installation meeting at least two weeks before starting work of this Section; require attendance by all affected installers.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, backer board and accessories. Include instructions for using grouts and adhesives.
- C. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, ceramic accessories, and setting details.
- D. Samples: Submit confirmation samples of each tile and color selected.
- E. 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 Tile: 5 percent of each size, color, and surface finish combination .

1.06 QUALITY ASSURANCE

- A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this Section, with minimum ten years of documented experience.
- C. Installer Qualifications: Company specializing in performing commercial tile installation, with minimum of 5 years of documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

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

- B. Deliver all products to job site in manufacturer's unopened, original containers with grade seals and marking intact. Keep tile cartons dry.

1.08 FIELD CONDITIONS

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of tilework and for 7 days after completion.
- C. Provide adequate lighting for good grouting and cleanup.
- D. Place in clean marked cartons exclusively for the Owner's use. Send written notice to the Architect identifying the quantity and location of extra tile furnished.

1.09 OWNER TRAINING

- A. A tile cleaning and maintenance training session for the Owner shall be held at the completed facility conducted by a qualified representative of the tile manufacturer. Printed tile maintenance instructions shall be provided to the Owner in advance of the training session.

PART 2 PRODUCTS

2.01 TILE

- A. Floor Tile: ANSI A137.1, standard grade, porcelain.
 - 1. Moisture Absorption, ASTM C373: 0 to 0.5 percent.
 - 2. D.C.O.F Coefficient of Friction, A137.1: > 0.42.
 - 3. Sizes, Shapes and Colors: To Match Existing, 12 x 12 inches.
 - 4. Thickness: 3/8 inch
 - 5. Grout Joint: Match Existing
 - 6. Basis of Design: Contractor shall submit, for approval by Architect, field matched tile. Tile shall replicate existing color, texture and size of tile in Lobby 101.
 - 7. Acceptable Manufacturers:
 - a. Crossville.
 - b. DalTile.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 TRIM AND ACCESSORIES

- A. Non-Ceramic Trim: Brushed stainless steel, style and dimensions to suit application, for setting using tile mortar or adhesive.
 - 1. NOTE: All flooring transitions shall be executed to provide a smooth and level floor surface.
 - 2. Applications:
 - a. Open edges of wall tile.
 - b. Open edges of floor tile.
 - c. Transition between floor finishes of different heights.
 - d. Thresholds at door openings.
 - e. Expansion and control joints, floor and wall.
 - 3. Products:
 - a. Schine by Schluter-Systems.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 SETTING MATERIALS

- A. Primer: As required for self-leveling underlayment.
 - 1. Product: Drytek Multipurpose Primer by Laticrete.
- B. Epoxy Adhesive and Mortar Bond Coat: ANSI A118.3.
 - 1. Applications: Where indicated on drawings.
 - 2. Products:
 - a. Laticrete Latapoxy 300 Adhesive by Laticrete.

- b. Kerapoxy by Mapei.
- c. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 GROUTS

- A. Polymer Modified Grout: ANSI A118.7 polymer modified cement grout.
 - 1. Applications: Use this type of grout where indicated and where no other type of grout is indicated.
 - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
 - 3. Color(s): See Finish Drawings.
 - 4. Products:
 - a. Laticrete PermaColor by Laticrete.
 - b. Mapei.
 - c. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 MAINTENANCE MATERIALS

- A. Grout Sealer: Liquid-applied, moisture and stain protection for existing or new Portland cement grout.
 - 1. Composition: Water-based colorless silicone.

2.06 ACCESSORY MATERIALS

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
 - 1. Thickness: 20 mils, maximum.
 - 2. Crack Resistance: No failure at 1/16 inch gap, minimum.
 - 3. Products:
 - a. Blue 92 Anti-Fracture Membrane by Laticrete.
 - b. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Mesh Tape: 2 inch wide self-adhesive fiberglass mesh tape.
- C. Tile and Grout Cleaners / Sealers: As recommended by the tile and grout manufacturers.

PART 3 EXECUTION

3.01 FLOOR TILE - EXAMINATION AND PREPARATION

- A. Before installing any ceramic tile inspect surfaces to receive tile and accessories. Notify the Architect and Contractor in writing of any defects or conditions that will prevent a satisfactory tile installation. Do not proceed with installation until satisfactory corrections have been made. Start of work implies acceptance of surfaces to receive tile.
- B. See Section 09 05 61 - Common Work Results for Flooring Preparation.
- C. Owner's testing agency shall test concrete slab surfaces prior to installation of any flooring. Test results shall be made available to the contractor for determination of acceptability by the floor tile and tile adhesive manufacturers. Contractor shall obtain instructions from flooring manufacturers if test results are not within their recommendation limits.
 - 1. Internal relative humidity rates per ASTM F2170.
 - 2. Alkalinity, pH rates per ASTM 710.
- D. Small Format Tile (thin set): Verify that sub-floor surfaces are smooth and flat, within tolerances of not more than 1/8" in 10 feet and are ready to receive tile. Leveling coat shall be provided as required.
- E. Adjust sub-floor surfaces at transitions to other flooring materials to provide a smooth transition of floor surfaces to facilitate movement of wheeled equipment, wheelchairs and minimizes tripping hazards.
 - 1. Mock-ups of each type of flooring transition shall be tested by the Owner and approved by the Architect prior to project-wide implementation.

- F. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

3.02 INSTALLATION - GENERAL

- A. Install tile and grout in accordance with best current practice of the industry and applicable requirements of ANSI A108.1 through A108.13, manufacturer's instructions, and TCA Handbook recommendations.
- B. Field verify all layouts and patterns with the Architect prior to proceeding. Lay tile to pattern indicated. Do not interrupt tile pattern through openings. Align joints when adjoining tiles on floor, base, walls and trim are the same size.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Make all cuts on the outer edges of the field. Smooth all cut edges with a carborundum stone, and install no tile with jagged or flaked edges. Form corners and bases neatly. Align floor joints.
- D. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption.
- E. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- F. Install non-ceramic trim in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Expansion Joints: Provide expansion joints directly over all building movement joints, whenever tile abuts restraining surfaces and not more than 20' on center each way in the tile field. Proposed joint details and locations shall be submitted for review to the Architect. Keep expansion joints free of adhesive or grout. Apply sealant to joints.
 - 1. Expansion joints over movement joints shall be equal in width to the joints below. Other expansion joints shall be width of grout joint or 1/8", whichever is greater.
 - 2. Install in accordance with TCA Handbook Method EJ171.
- J. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- K. Grout tile joints.
- L. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.
- M. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes. All inside corner of ceramic wall tile in wet areas shall be kept free of grout and shall be sealed with a continuous bead of silicone, color to match grout.

3.03 INSTALLATION - FLOORS - THIN-SET METHODS

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout, unless otherwise indicated.
 - 1. Where epoxy bond coat and grout are indicated, install in accordance with TCNA (HB) Method F131.
- B. Install tile-to-tile floor movement joints in accordance with TCNA (HB) Method EJ171F.

3.04 CLEANING

- A. Upon completion of setting and grouting, sponge and wash tile thoroughly, diagonally across joints. Use tile and grout cleaners as recommended by the manufacturer. Finally polish with clean, dry cloths.
- B. Do not use acid or acid cleaners to clean glazed tile. Acid cleaning of unglazed tile shall not be done before 10 days after setting, and then only when approved by the tile manufacturer.
- C. Clean and seal all floor tile surfaces with product recommended by the manufacturer for each type of tile and anticipated traffic just prior to Substantial Completion.

3.05 PROTECTION

- A. Do not permit traffic over finished floor surfaces for at least 4 days after installation is completed. Protect installed tile work as recommended by the manufacturer during construction to prevent damage.

END OF SECTION

SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling systems with acoustical tiles.

1.02 RELATED REQUIREMENTS

- A. Section 05 31 00 - Steel Decking: Execution requirements for placement of attachment anchors to structure above.
- B. Section 07 21 00 - Thermal Insulation: Encapsulated acoustical batt insulation above ceilings.
- C. Section 09 21 16 - Gypsum Board Assemblies: Drywall ceilings and soffits.
- D. Division 21 - Fire Suppression: Sprinkler heads in ceilings.
- E. Division 23 - HVAC: Air diffusers in ceilings.
- F. Division 26 - Electrical: Light fixtures and other devices in ceiling.

1.03 REFERENCE STANDARDS

- A. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels; 2008.
- C. ASTM E580 - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2011.
- D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2014.
- E. UL - Fire Resistance Directory; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate work of this Section with installation of mechanical and electrical components and with other construction activities affected by work of this Section.
- B. Supply hanger clips during steel deck erection. Supply additional hangers and inserts as required.
- C. 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.
- D. Do not install acoustical tiles 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 tiles.
- C. Shop Drawings: Submit installation details for types and locations of ceiling system seismic restraints.
- D. Samples:
 - 1. Submit samples 4x4 inch minimum in size, of selected acoustical tiles.
 - 2. Submit samples 8 inches minimum long, of suspension system main runner.
- E. Manufacturer's Installation Instructions: Indicate special procedures.
- 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 Acoustical Tiles: Quantity equal to 5 percent of total installed.

3. Extra stock shall match products installed and shall be packaged in protective covers for storage and identified with labels describing contents. Store as directed by the Owner. Send written notice to the Architect identifying the quantity and location of extra tile furnished. The tile shall not be used by the Contractor for corrective work during the warranty period.

1.06 QUALITY ASSURANCE

- A. Suspension System and Acoustical Tile Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum fifteen years documented experience. Seismic design of ceiling system shall be under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in New Hampshire.
- B. Installer Qualifications: Company specializing in performing the work of this Section with a minimum of five years of experience and authorized by the ceiling system manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Accept factory-finished products on site in manufacturer's unopened factory packaging only; reject opened packages.
- B. Protect factory-finished products from damage to appearance by storing products in manufacturer's unopened factory packaging in dry storage area.

1.08 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of no more than 70 percent prior to, during, and after acoustical unit installation. Acoustic materials shall reach room temperature and moisture content prior to installation. Operate ventilation system for not less than 48 hours beginning acoustical panel ceiling installation.

1.09 WARRANTY

- A. See Section 01 78 00 - Project Close-out, for additional warranty requirements.
- B. Provide manufacturer's standard one year warranty.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Basis of Design: Armstrong World Industries, Inc.
- B. Acceptable Manufacturers:
 1. CertainTeed Corp.
 2. USG.
 3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACOUSTICAL TILES

- A. Acoustical Tiles - General: ASTM E1264, Class A.
 1. VOC Content: Certified as Low Emission by GreenGuard Children and Schools or CHPS. Low-Emitting Materials.
- B. Acoustical Tile Type ACT-1: Painted mineral fiber, ASTM E1264 Type III.
 1. Size: 24 inches x 24 inches.
 2. Thickness: 5/8 inches.
 3. Composition: Wet felted.
 4. Light Reflectance: not less than 0.80.
 5. NRC: not less than 0.55
 6. Edge: Tegular.
 7. Surface Color: White.
 8. Surface Pattern: Non-directional fissured.
 9. Suspension System: Exposed grid Type 1.
 10. Miscellaneous Accessories: Hold-Down clips.

11. Product: Cortega Second Look by Armstrong World Industries.

2.03 SUSPENSION SYSTEMS

- A. Manufacturer: Same as for acoustical tiles.
- B. Suspension Systems - General: ASTM C635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.
- C. Exposed Steel Suspension System Type 1: Formed steel, commercial quality cold rolled; intermediate-duty.
 - 1. Profile: Tee; 15/16 inch wide face.
 - 2. Construction: Double web.
 - 3. Finish: White painted and black where indicated.
 - 4. Product: Prelude XL 15/16 by Armstrong World Industries, Inc.

2.04 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
 - 1. Hanger wire: Galvanized soft temper, pre-stretched steel wire, per ASTM A641, with yield strength of at least 3 times design load, but not less than 12-gage diameter.
- B. Perimeter Moldings: Same material and finish as grid, size suitable for suspension system and ceiling unit profile.
 - 1. At Exposed Grid for Seismic Design Category C: 2" L-shaped molding for mounting at same elevation as face of grid.
- C. Accessory Moldings: Inside and outside corner pieces, and where applicable, matching fillers at bullnose corners.
- D. Stiffening Braces: As manufactured by the suspension system manufacturer to provide grid stabilization.
- E. Other Accessories: As required, specifically designed for intended use with suspension components employed, in accordance with ASA specifications. Provide all special hardware required for fire-rated, sloped and vertical installations, as necessary to comply with applicable codes and standards of good practice.
- F. Expansion Joint Moldings: For non-fire rated ceiling-wall interface or ceiling-to-ceiling interface at building expansion joints, sized as required.
 - 1. Product: Series DXX by MM Systems.
- G. Touch-up Paint: Type and color to match acoustical and grid units.
- H. Hold-Down Clips: Corrosion resistant plated spring steel.

PART 3 EXECUTION

3.01 EXAMINATION AND PREPARATION

- A. Verify existing conditions before starting work. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Verify that layout of hangers will not interfere with other work.
- C. Any questions or conflicts shall be brought to the attention of the Architect prior to proceeding with the Work.
- D. Provide hanger clips during steel deck erection. Do not support ceiling directly from steel roof deck or tabs. Provide additional hangers and inserts as required. Connect hanger wires directly either to structure, or to inserts, eye screws or other devices that are secure and appropriate for the substrate. All hangers and supports shall be secured in such a way that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636, ASTM E580, 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. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Install hangers plumb. Angle hangers only where required to miss obstructions. Any non-plumb hangers that result in horizontal forces shall be braced. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- F. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three (3) tight turns. Secure bracing wire to ceiling suspension members and to supports with a minimum of four (4) tight turns.
- G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance. Alternatively, install supplemental suspension members and hangers in the form of trapeze or equivalent devices, sized to support ceiling loads.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.
- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
 - 2. Overlap corners.
- L. Provide additional hangers for the suspension system at each corner of light fixtures if independent support of fixtures is not required by Electrical documents. All light fixtures in excess of 56 lbs. shall be independently supported.
- M. Provide additional hangers for air terminal units or services weighing more than 20 lbs. but less than 56 lbs. in addition to positively attaching them to the ceiling suspension system. Units weighing more than 56 lbs. shall be independently supported to the building structure.
- N. Provide framing for recessed light fixtures, air outlets, diffusers, etc. See Architectural, Mechanical, and Electrical Drawings.
- O. Expansion Joint Moldings: Install at intersection of ceilings and firewalls, building expansion joints, and where indicated on the Drawings.
- P. Where approved by the Architect and where field conditions require lowering a portion of a ceiling to conceal piping or ductwork, the ceiling contractor shall provide a ceiling height change and transition at no additional cost to the Owner.

3.03 INSTALLATION - SUSPENSION SYSTEM SEISMIC REQUIREMENTS

- A. Provide suspension, bracing, and attachments in strict accordance with ASCE7-05, and referenced editions of ASTM C635, ASTM C636 and CISCA Recommendations For Direct-Hung Acoustical Tile and Lay-in Panel Ceilings. The requirements for seismic bracing shall generally include, but not be limited to the following features:
 - 1. This Project is a Seismic Design Category C.
 - 2. For Seismic Design Category C: CISCA requirements for Seismic Zones 0-2 and provisions in ASCE 7.

- a. For suspended ceiling areas equal to or less than 144 sq. ft. in size that are surrounded by walls or soffits that are laterally braced to the structure: Standard installation per ASTM C636, no seismic restraint is required.
- b. For suspended ceiling areas more than 144 sq. ft in size that are not surrounded by walls or soffits that are laterally braced to the structure:
 - 1) The suspension system (grid) shall be designed, tested, and rated for ultimate load capacity as per ASCE 7.
 - 2) All sides of the space shall have tees cut back 3/8" at the perimeter to accommodate movement and shall not be attached to the perimeter molding. Perimeter moldings shall provide a minimum supporting ledge of 7/8" for tees or all tees shall be independently supported within 8" of the perimeter. All ends of main runners and cross members shall be tied together or shall have stabilizer/spacer bars attached to members to prevent spreading. Permanent attachment (i.e. pop rivets) for grid alignment shall not be permitted.
 - 3) Openings for sprinkler heads shall provide a minimum of 1/4" clearance on all sides of the piping. All other ceiling penetrations shall provide a minimum of 3/8" clearance.
- c. For spaces 144 sq. ft. and greater in size, in general provide:
 - 1) The total weight of the suspension system (grid), tiles, and other ceiling components (light fixtures, air terminals, etc.) shall be no greater than 2.5 PSF, or other ceiling components shall be independently supported.
 - 2) The suspension system (grid) shall be designed, tested, and rated for ultimate load capacity as per ASCE 7.
 - 3) All sides of the space shall have tees cut back 3/8" at the perimeter to accommodate movement and shall not be attached to the perimeter molding. Perimeter moldings shall provide a minimum supporting ledge of 7/8" for tees or all tees shall be independently supported within 8" of the perimeter. All ends of main runners and cross members shall be tied together or shall have stabilizer/spacer bars attached to members to prevent spreading. Permanent attachment (i.e. pop rivets) for grid alignment shall not be permitted.
 - 4) Openings for sprinkler heads shall provide a minimum of 1/4" clearance on all sides of the piping. All other ceiling penetrations shall provide a minimum of 3/8" clearance.

3.04 INSTALLATION - ACOUSTICAL TILES

- A. Owner's Inspection: All areas above suspended ceilings shall be inspected by the Owner prior to installation of ceiling tiles. The Contractor shall obtain written permission from the Owner to proceed with ceiling tile installation. Failure to follow this procedure shall result in removal and reinstallation of ceiling panels to facilitate inspection at no additional cost to the Owner.
- B. Install acoustical tiles in accordance with manufacturer's instructions.
- C. Fit acoustical tiles in place, free from damaged edges or other defects detrimental to appearance and function.
- D. Lay directional patterned tiles with pattern parallel to longest room axis.
- E. Fit border trim neatly against abutting surfaces.
- F. Install tiles after above-ceiling work is complete. Do not install tile until mechanical and electrical systems are tested and complete and all firestopping and smoke seals have been inspected and accepted.
- G. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- H. Cutting Acoustical Tile:
 1. Cut to fit irregular grid and perimeter edge trim.
 2. Make field cut edges of same profile as factory edges.
 3. Double cut and field paint exposed reveal edges.
- I. Where round obstructions occur, provide preformed closures to match perimeter molding.

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.

3.06 CLEANING

- A. Clean soiled exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members as recommended by the manufacturer. Remove and replace damaged ceiling components that cannot be successfully cleaned and repaired.

END OF SECTION

SECTION 09 65 00
RESILIENT FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient wall base and installation accessories.
- B. Substrate preparation.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements.

1.03 REFERENCE STANDARDS

- A. ASTM F1861 - Standard Specification for Resilient Wall Base; 2012.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes and colors available; and installation instructions.
- C. Verification Samples: Submit samples, 3 x 3 inch in size illustrating colors and patterns for each resilient flooring product specified.
- D. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, and Section 01 78 00 - Project Close-out, for additional provisions.
 - 2. Extra Wall Base: 10 linear feet of each type and color.
 - 3. Materials shall be provided in unbroken packaging when job is complete. Notify the Architect in writing of the quantity and location of materials furnished. These materials may not be used by the Contractor for corrective work during the warranty period.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer certified in writing by the flooring manufacturer to be qualified for installation of specified flooring system, with a minimum of five years of experience in the field.
- B. All resilient flooring shall comply with ASTM E84 Flame Spread Rating of Class II (75 or less) and ASTM E662 Smoke Developed (450 or less) unless otherwise indicated.
- C. All colors shall match as directed by the Architect and shall be from the same "color run" or "dye lot".
- D. All adhesives shall be as recommended by the product manufacturer and shall be formulated asbestos-free.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Deliver materials to project site in unopened containers clearly labeled with manufacturer's name and identification of contents.
- B. Store all materials off of the floor in an acclimatized, weather-tight space. Protect roll materials from damage and as directed by the manufacturer. All resilient flooring materials shall be stored in undamaged condition as packaged by the manufacturer, with manufacturer's seals and labels in-tact.

1.07 FIELD CONDITIONS

- A. See Section 01 00 00 - General Requirements, for minimum indoor air quality improvement requirements.

- B. Maintain temperature in storage area between 65 degrees F and 90 degrees F.
- C. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F.

1.08 WARRANTY

- A. See Section 01 78 00 - Project Close-out, for additional requirements.
- B. Provide manufacturer's product warranty. See product listing for term.

PART 2 PRODUCTS

2.01 RESILIENT BASE

- A. Resilient Base: Type TP; rubber coated PVC; field made outside corners.
 - 1. Provide cove base.
 - 2. Surface Burning Characteristics, ASTM E84: Class A.
 - 3. Critical Radiant Flux, ASTM E648: Class 1; minimum 0.45 watt per sq cm.
 - 4. Height: 4 inches.
 - 5. Thickness: 0.125 inch thick.
 - 6. Finish: Satin.
 - 7. Length: Roll.
 - 8. Colors: Selected by architect from manufacturer's full standard.
 - 9. Warranty: Two years.
 - 10. Basis of Design: Traditional Rubber Wall Base by Johnsonite, Inc.
 - 11. Acceptable Products:
 - a. Profiles Rubber Wall Base by Burke Flooring.
 - b. Color Integrated Rubber Base by Armstrong World Industries, Inc.
 - c. Wall Base by Nora.
 - d. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES

- A. Primers, Adhesives, and Seaming Materials: Waterproof; low VOC types recommended by flooring manufacturers.
- B. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 GENERAL

- A. Base shall be continuous as scheduled unless otherwise approved by the Architect. Base shall return to door or window frames at all openings.
- B. Thoroughly clean the substrate.

3.02 INSTALLATION

- A. Starting installation constitutes acceptance of substrate conditions.
- B. Install in accordance with manufacturer's instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.

3.03 RESILIENT BASE

- A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches between joints. Install wall base in lengths as long as without gaps at seams and with tops of adjacent pieces aligned. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

- B. Miter internal corners. At external corners, 'V' cut back of base strip to 2/3 of its thickness and fold. Special attention shall be paid to firmly securing base around bull nose corners.
- C. Install base on solid backing. Bond tightly to wall and floor surfaces.
- D. Scribe and fit to door frames and other interruptions. Install base on all built-in cabinets, locker bases, etc., unless specifically indicated otherwise. Base shall extend around all sides of cabinetwork.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.

3.05 CLEANING

- A. Immediately after installation, remove excess adhesive and other blemishes from base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's instructions.

END OF SECTION

SECTION 09 90 00
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. All necessary surface preparation.
- B. Field application of paints.
- C. Scope: Finish all interior surfaces exposed to view, unless fully factory-finished.
 - 1. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.
 - c. On the roof and outdoors, paint all equipment that is exposed to weather or to view, exception that which is factory-finished.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Items indicated to receive other finishes.
 - 3. Items indicated to remain unfinished.
 - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 5. Roofing and flashing.
 - 6. Floors, unless specifically so indicated.
 - 7. Ceramic and other tiles.
 - 8. Glass.
 - 9. Acoustical materials, unless specifically so indicated.
 - 10. Concealed pipes, ducts, and conduits.
- E. Surface preparation, patching and repainting of existing interior walls, partitions, and ceilings disturbed by the Work, as indicated on the Drawings or as otherwise required.
- F. Painting of exposed piping, pipe insulation, ductwork, conduit, wiremold, etc.
- G. Painting of all exposed materials and equipment installed under Divisions 21, 23 and 26 (including on roofs) except for those installed in Mechanical and Electrical Rooms, factory finish painted, or except when painting is specifically included under those Sections.
- H. Field testing for substrate moisture content and alkalinity.
- I. Field testing compatibility of new paint with shop-applied primers, existing paint or finishes to be covered.
- J. Verification of compatibility of shop primers (mechanical equipment, structural steel, steel fabrications, etc.) with finish coatings specified herein.
- K. The painting subcontractor shall examine all the Sections of the Specifications and shall thoroughly familiarize himself with all their provisions regarding painting and finishing.
 - 1. All surfaces that are primed or left unfinished by the requirements of other Sections of the Specifications shall be painted or finished as a part of this Section, unless specifically indicated otherwise.
 - 2. Areas of new patches in existing construction shall be painted or finished, and where not scheduled, shall match the existing finish.
- L. Color / Finish Schedule: After acceptance of the paint manufacturer, the Architect shall prepare a color schedule based on paint manufacturer's color chips showing where various colors shall

be applied. The Architect will select all colors and determine the number of colors to be used on the job.

M. Finish Schedule: Refer to the Interior Design Drawings for color selections and product types.

1.02 RELATED REQUIREMENTS

- A. Section 05 12 00 - Structural Steel: Shop-primed items.
- B. Section 06 20 00 - Finish Carpentry: Shop-finished hardwood millwork.

1.03 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.
- C. GreenSeal GS-11 - Paints and Coatings; 2013.

1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on all finishing products, including VOC content. List each product and cross-reference it to the specification's Part 2, Products.
- C. Samples: Submit a complete range of paint manufacturer's color chips. Non-conformance to the specification and a limited range of color samples shall be considered sufficient reason for rejection of a paint manufacturer.
- D. Samples: Submit two paper chip samples, 4 x 4 inch in size illustrating range of colors and textures available for each textured surface finishing product scheduled.
- E. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
- F. Manufacturer's Instructions: Indicate special surface preparation procedures.
- G. Maintenance Manual: Provide a paint and coatings maintenance manual including area summary with finish schedule, area detail designating location where each product, color, finish was used, product data pages, MSDS sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- H. Following the satisfactory completion of all painting, the Contractor shall prepare and submit to the Architect typed copies of a complete list of all materials and colors used for the Work. This list shall be sufficiently clear and complete for the Owner's use in purchasing materials required for touch-up and repainting.

1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the work of this Section with minimum five years experience and shall have completed similar painting system applications with a record of successful in-service performance.
- B. Material Data Sheet product information for all painting products shall be kept on file on the job site before work begins.
- C. All materials shall be thoroughly stirred. No materials shall be reduced or changed in any way. Any tinting or matching of colors shall be done to the satisfaction of the Architect. In all cases a sample shall be applied on the job and Architect must approve before work is actually begun. Execute work in accordance with manufacturer's printed instructions.
- D. All work where a coat of materials has been applied must be accepted by the Architect before the application of the succeeding specified coat; otherwise, no credit for the coat applied will be given, and the Contractor shall then assume the responsibility and re-coat the work in question. The painting subcontractor shall finish the Architect with a report of each coat applied when completed for observation to comply with the above.

1.06 REGULATORY REQUIREMENTS

- A. For New Hampshire projects, all field applied paints and coatings shall meet state VOC standards.

1.07 MOCK-UP

- A. See Section 01 40 00 - Quality Requirements, for general requirements for mock-up.
- B. Provide a finished sample room, complete or in part, with all finish items completed in accordance with the Specification and in selected colors. Items not accepted shall be re-finished. When accepted, they shall serve as a standard for workmanship, appearance and materials for similar areas throughout this Project.
- C. Accepted mock-ups may remain as part of the Work.

1.08 PRE-INSTALLATION MEETING

- A. A pre-installation meeting shall be held at the jobsite, including: Contractor, painting subcontractor, paint manufacturer's technical representative, Owner's representative and Architect. The purpose of the meeting shall be to review existing conditions. The paint manufacturer's technical representative shall perform an on-site inspection to confirm compatibility and suitability of specified materials, following which he shall provide written certification that all materials specified are entirely suitable for their proposed applications.

1.09 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in manufacturer's sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.
- D. Store all materials used on the job in a single place. Keep storage place neat, dry and clean. All soiled or used rags, waste and trash must be removed from the building every night, and every precaution taken to avoid the danger of fire. All materials shall be protected from freezing.

1.10 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.
- F. The Owner and all subcontractors shall be kept informed of the use of products that may generate fumes in advance of the use of such products.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Paints:

1. Basis of Design: Sherwin Williams Co.
2. Acceptable Manufacturers:
 - a. Benjamin Moore & Co.
 - b. PPG Architectural Finishes, Inc.

C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

- A. All materials used on the Work shall be as specified in brand and quality. No claims as to unsuitability or unavailability of any materials specified, or unwillingness to use same, or inability to produce first class work with same, will be entertained unless such claims are made in writing and submitted prior to the receipt of proposals.
- B. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
 1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. Supply each coating material in quantity required to complete entire project's work from a single production run.
 4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- C. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- D. Volatile Organic Compound (VOC) Content:
 1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 - b. Architectural coatings VOC limits of State in which the project is located.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

2.03 PAINT SYSTEMS - EXTERIOR

- A. Ferrous Metals, heavy duty, Acrylic, 3 Coat:
 1. Ferrous Metals Surface Preparation: SSPC-Sp6 Blast Clean.
 2. Primer 1st coat; SW Pro-Cryl Universal Acrylic Primer, B66-310. 2-4 mils DFT.
 3. Gloss: 2nd and 3rd coats ; SW Sher-Cryl HPA Acrylic B66-300. 2.5-4 mils DFT/coat.
 4. Semi-gloss: 2nd and 3rd coats; SW Sher-Cryl HPA Acrylic B66-350. 2.5-4 mils DFT/coat.
- B. Galvanized Metals, heavy duty, Acrylic, 3 Coat:
 1. Primer 1st coat; SW Pro-Cryl Universal Acrylic Primer B66-310. 2-4 mils DFT.
 2. Gloss: 2nd and 3rd coats ; SW Sher-Cryl HPA Acrylic B66-300. 2.5-4 mils DFT/coat.
 3. Semi-gloss: 2nd and 3rd coats ; SW Sher-Cryl HPA Acrylic B66-350.2.5-4 mils DFT/coat.

2.04 PAINT SYSTEMS - INTERIOR

- A. Concrete/Masonry, Opaque, Latex, 3 Coat (4 at LtWt):
 1. Application: For general painted walls.
 2. Filler/Primer 1st coat: SW Block Filler B42W46.
(At all light-weight aggregate CMU: Two coats Filler/Primer.)
 3. Egg-Shell: 2nd and 3rd coats ; SW Harmony Low Odor Latex Eg-Shel B9. 1.6 mil DFT/coat.
 4. Flat: 2nd and 3rd coats ; SW Harmony Low Odor Latex Flat B5. 1.7 mil DFT/coat.

- B. Ferrous Metals, Acrylic, 3 Coat:
 - 1. Primer 1st coat; SW Pro-Cryl Universal Acrylic Primer B66-310. 2-4 mils DFT.
 - 2. Semi-gloss: 2nd and 3rd coats; SW ProClassic Waterborne Acrylic. B31 Series, 1.4 mils DFT/coat.
- C. Ferrous Metals, Pre-Primed, Acrylic, 2 Coat:
 - 1. Applications: Factory primed hollow metal frames and doors.
 - 2. Semi-gloss: 1st and 2nd coats ; SW Pro Industrial DTM Acrylic Semi-Gloss, B66W01151, 2.5- 4 mils DFT..
- D. Gypsum Board, Latex, 3 Coats:
 - 1. Applications:
 - a. Eggshell: For general walls.
 - b. Flat: For ceilings and soffits.
 - c. Semi-gloss: For toilet rooms and bathrooms.
 - 2. 1st coat primer; SW ProMar 200 Zero VOC Interior Latex Primer, B28W02600, 1 mil DFT.
 - 3. Semi-gloss: 2nd and 3rd coats ; SW ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31-2600 Series; 1.6 mils DFT.
 - 4. Eggshell: 2nd and 3rd coats: SW ProMar 200 Zero VOC Interior Latex Eg-Shel, B20W02651, 1.7 mils DFT/coat.
 - 5. Flat: 2nd and 3rd coats; SW ProMar 200 Zero VOC Interior Latex Flat, B30-2600 Series, 1.6 mils DFT.

2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Other materials not specifically indicated but required to achieve the finishes specified; commercial quality, "best grade" of "first line" made by reputable, recognized manufacturers, shall be compatible with related products and shall bear manufacturer's labels.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 WORKMANSHIP

- A. Employ skilled mechanics to ensure the very best workmanship. Quality workmanship is required. Materials shall be applied by craftsmen experienced in the use of the specific product involved.
- B. All materials shall be applied in strict accordance with the manufacturer's printed instructions.
- C. Finish work shall be uniform and of the approved color. Paint and stain shall completely cover, be smooth and free from runs, sags, clogging, excessive flooding, or brush marks. Make edges of paint and stain adjoining other materials or colors sharp and clean without overlapping.

3.02 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
- F. Submit test results and action taken to the Architect prior to the application of paint products.

- G. Prime coats specified herein will not be required on items delivered with shop or factory prime coats already applied, providing that shop prime coats are equal in quality to those specified and the painting subcontractor determines their total compatibility with finish coats.

3.03 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or repair existing coatings that exhibit surface defects.
- D. General: Do not begin painting on any surface until it is in proper condition to receive the paint or as specified. Should any surface be found unsuitable to produce a proper finish, the Architect and product manufacturer shall be notified in writing and no material shall be applied until the unsuitable surfaces have been made satisfactory.
- E. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- F. Seal surfaces that might cause bleed through or staining of topcoat.
- G. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- H. New Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry. Fill all minor irregularities with approved patching materials and rub to a texture similar to adjacent surfaces. New concrete and masonry shall not be coated for at least 28 days.
 - 1. Testing: Determine alkalinity and moisture content of surfaces by performing appropriate tests. Submit results to the Architect. If the alkalinity of the surfaces could cause the paint to blister and burn, correct this condition before application. Do no paint surfaces where moisture content exceeds that permitted by the paint manufacturer.
 - 2. Note special preparation of surfaces to receive wall coverings. See Section 09 72 00 - Wall Coverings.
- I. Previously Painted Concrete and Unit Masonry Surfaces: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Test for alkalinity and moisture content if there is any evidence of possible moisture in the walls. Fill all minor irregularities with approved patching materials and rub to a texture similar to adjacent surfaces.
- J. New Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound and sand to smooth level surface. Exercise care to avoid raising nap of paper. Spot prime defects after repair.
- K. For Previously Painted Gypsum Board Surfaces: Remove grease, dirt, and other foreign materials as necessary to receive paint. Lightly sandpaper to smooth and even surface and then dust off. Fill all minor irregularities with approved patching materials and sand to smooth level surface. Exercise care to avoid raising nap of paper. Prime paint any patched surfaces.
- L. New Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer or abrade all surfaces with 60 grit paper to create a uniform anchor profile, then prime.
- M. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- N. Previously Painted Aluminum and Galvanized Surfaces: Thoroughly remove all non-adhered paint, abrade these surfaces with 60 grit paper to create a uniform anchor profile and thoroughly solvent clean. Remove all grease, dirt, and other contaminants by cleaning as recommended by the paint manufacturer.

- O. New Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- P. New Shop-Primed Interior Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
- Q. New Shop-Primed Exterior Steel Surfaces to be Finish Painted: Sand-blast to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Touch-up primer where disturbed.
- R. Previously Painted Ferrous Metal: Remove grease, dirt, rust, and other foreign materials as necessary to receive paint. Sandpaper surfaces to a smooth, even surface and dust off. Touch-up any chipped or abraded surfaces and fill all holes and other surface imperfections with metal repair bondo, sand smooth and prime.
- S. Non-compatible Shop Primers: Cover with suitable barrier coat or remove primer and reprime as required.
 - 1. Testing: Apply a test patch of the new painting system to test for adhesion. Allow to dry one week before testing per ASTM D3359. If new painting system lifts, completely remove the existing finish.

3.04 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Spray painted wall surfaces shall be back-rolled.
- C. No interior painting or finishing shall be permitted until the building has been thoroughly dried out. See Environmental Requirements for application air temperature requirements. Relative humidity shall be 75% maximum. Moisture levels for painting shall be within 5 degrees F of the dew point and shall be determined by use of an electronic moisture meter.
- D. The atmosphere shall be relatively free of airborne dust. Each coat of paint shall be applied smoothly, worked out evenly and allowed to dry completely before the subsequent coat is applied. Follow manufacturer's labeled instructions for drying time between coats
- E. Apply products in accordance with manufacturer's instructions.
- F. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- G. Before painting, remove hardware, accessories, plates, lighting fixtures and similar items or provide ample protection of such items. On completion of each area, replace items removed.
- H. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- I. Sand metal surfaces, enamels and varnishes lightly between coats to achieve required finish.
- J. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- K. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- L. All doors and frames shall have the same finish and number of coats on both interior and exterior sides. Do not paint over door and frame fire-rating labels.
- M. All exposed structures (columns, trusses, beams, joist, deck, etc.) shall be painted the same color selected by the Architect, unless specifically indicated otherwise.
- N. Upon completion, touch up and restore finish where damaged and leave in good condition.
- O. Paint shop-primed equipment.

- P. Access panels, registers, cabinet heaters, radiators, and electrical panels and similar equipment shall be painted in colors as selected by the Architect.
- Q. Exposed piping, conduit, wiremold, ductwork, pipe insulation, and hangers shall be painted in colors selected by the Architect.
- R. Access panel doors and frames shall be painted to match wall color.
- S. Upon completion of painting, reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- T. Wall surfaces to receive wall protection panels shall be primed.

3.05 FIELD QUALITY CONTROL

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field testing.
- B. If test results show material being used does not comply with the specified requirements, the Contractor may be directed to stop painting, remove non-complying paint, pay for testing and repaint surfaces coated with the rejected product.

3.06 CLEANING AND PROTECTION

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

3.07 PROTECTION

- A. Protect finished coatings until completion of project.
- B. Provide drop cloths in all areas where painting is being done to protect floors and other work from damage during painting. Mask or otherwise protect smaller objects adjacent to painted surfaces.
- C. Waste materials shall not be disposed of in the existing sanitary system.
- D. When the Work of this Section is completed, remove all surplus materials and scaffolding from the premises and clean off all misplaced paint, varnish, stain and the like so as to leave the premises in perfect condition, free of all paint.

END OF SECTION

SECTION 10 14 24
INTERIOR SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior ADA compliant signage.

1.02 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's descriptive literature.
- C. Shop Drawings:
 - 1. Interior Signs: Submit shop drawings showing to scale all sign types including lettering, layout and dimensions.
 - 2. Sign Schedule: Submit a sign schedule with all signs listed by door number location. Sign schedule shall include sign type, side of wall for mounting by room number, and sign text.
- D. Samples:
 - 1. Selection Samples: Submit complete set of plastic color chips representing manufacturer's full range of available colors.
 - 2. Verification Samples: Submit full size sample signs of each type, representing type, style, color and method of attachment specified.

1.03 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with requirements of ANSI/ICC A117.1 and ADAAG.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Inspect products upon receipt. Store products in manufacturer's packaging until ready for installation.

1.05 WARRANTY

- A. See Section 01 78 10 - Warranties for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. ADA Signs Basis of Design: HC300 ADA System by Best Sign Systems.
- B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 INTERIOR SIGNS

- A. ADA-Compliant Interior Signage with Raised Borders:
 - 1. Type: Four-in one construction with raised borders; three-ply melamine plastic laminate with phenolic core signs, with lettering and symbols raised 1/32 inch from sign plate face; and 3/8 inch wide, 1/32 inch raised perimeter border with 1/8 inch inside radius.
 - 2. Sign Thickness: 1/8 inch thick or 1/4 inch thick as required.
 - 3. Construction: One-piece; added-on or engraved characters not acceptable.
 - 4. Lettering Style: Helvetica Medium, upper case.
 - 5. Braille: Grade 2 Braille, placed directly below last line of letters or numbers.
 - 6. Performance: Non-static, fire-retardant, and self-extinguishing.
 - 7. Contrast: Letters numbers and symbols shall contrast with background.
 - 8. Corners: Outside radius, 1/2 inch.
 - 9. Color of Plastic: As selected from manufacturer's standard colors.
 - 10. Finish of Plastic: Matte.
 - 11. Color of Background: As selected from manufacturer's standard paint colors.

12. Sign Margins: Letters and numbers centered on sign with 1/2 inch side margins and 3/8 inch top/bottom margins.
13. Sign Sizes:
 - a. Restroom and symbol signs, 8 by 8 inches.
 - b. Room identification signs, 9-1/2 by 4-3/4 inches.
 - c. Room number signs, 4-3/4 by 4-3/4 inches.
 - d. Exit signs, 8 by 4 inches.
- B. Sign Types: Numbers and text may change at a later date, but the Contractor's bid shall be based on the following:
 1. Room Number Signs: One sign with room number for every door scheduled on the Door Schedule. (Exception: Toilet Rooms).
 2. Toilet Room Signs: Instead of room number text, all toilet rooms shall be identified as "Restroom".
 - a. Accessible toilet room signs shall include a 6" x 6" International Symbol of Access.
 3. Exit Signs: One sign with "EXIT" text at every door with a lighted exit sign. See the Electrical Drawings for locations of lighted exit signs.
 4. Stair Signs: Required within the stair enclosure at all floor landings of all stairs serving three or more stories. Signs shall indicate:
 - a. Stair identifying name and floor level.
 - b. Terminus level of the top and bottom of the stair enclosure.
 - c. Floor level of and direction to exit discharge.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine installation areas to ensure that conditions are suitable for installation.
- B. Examine signage for defects prior to installation. Do not install damaged signage.

3.02 PREPARATION

- A. Verify mounting heights and locations for interior signage will comply with referenced standards.
- B. Clean mounting locations of dirt, dust, grease or similar conditions that would prevent proper installation.

3.03 SIGNAGE INSTALLATION

- A. Install signs level, plumb, without distortion, and in proper relationship with adjacent surfaces using manufacturer's recommended standard mounting system.
 1. Mount signs with taper-resistant screws, minimum 4 per sign. All signs over ten inches in length shall be furnished with additional intermediate screws (top and bottom).
 2. Mount signs with double-sided foam tape to smooth, non-porous surfaces. On cork surfaces, screw fastens same color and size backer plate through cork surface into wall. Use foam-tape over backer sign plate to mount room sign.
 3. Mount signs at cork surfaces with color matching screws and backer plate to match sign size. Use double-sided foam tape to secure sign to backer plate.
 4. Mount signs on glass with double-sided foam tape and provide matching sized blank sign panel for back side of glass.
- B. Mounting Height and Locations:
 1. Mounting locations shall be as determined by the Architect.
 2. In general, signs shall be mounted at 60" above the floor to the base line of the upper line of text. This is a maximum limit and shall not be exceeded.
 - a. For locations where this cannot be done, the acceptable mounting height range is at least 48" above the floor to the base line of the lowest line of text to a maximum of 60" above the floor to the base line of the upper line of text.

3. For door signs, mounting shall be within 18" laterally of the door latch jamb. Signs shall not be located so as to be obscured by doors in the open position.
 4. Signs shall be located so that a person can approach a sign within three (3") inches without encountering obstacles or standing within the swing of the door.
- C. Clean signs and remove adhesive from exposed sign surfaces after installation as recommended by manufacturer.
 - D. Replace damaged products before Substantial Completion.

END OF SECTION

SECTION 12 48 13
ENTRANCE FLOOR MATS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Carpet mats.
- B. Substrate patching and leveling.

1.02 RELATED SECTIONS

- A. Section 01 40 00 - Quality Requirements: Concrete substrate moisture testing.
- B. Section 09 05 61 - Common Work Results for Flooring Preparation: Concrete slab moisture testing and substrate preparation.

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for all mat materials.
- C. Shop Drawings: Submit seaming diagram for roll goods; indicated dimensions.
- D. Samples: Submit samples 4 x 4 inches minimum in size, illustrating pattern, color and finish of all mats.
- E. Certification and Field Reports: Prior to installation of mats submit written certification from the manufacturer that condition of sub-floor is acceptable for installation.
- F. Maintenance Materials:
 - 1. See Section 01 60 00 - Product Requirements, and Section 01 78 00 - Project Close-out, for additional provisions.
 - 2. Extra Mat tile material: 5% of each type and color installed.
 - 3. Materials shall be provided in unbroken packaging when job is complete. Notify the Architect in writing of the quantity and location of materials furnished. These materials may not be used by the Contractor for corrective work during the warranty period.
- G. Maintenance Data: Include cleaning instructions, stain removal procedures.

1.04 PRE-INSTALLATION MEETING

- A. Convene a pre-installation meeting after the results of slab testing are available and at least two weeks before starting work of this Section; require attendance by the Contractor, a technical representative from each flooring manufacturer, flooring installer, Architect and Owner, to review slab moisture levels, floor surface conditions and preparation requirements, materials, installation procedures and coordination of related work.
 - 1. A field report summarizing the findings and recommendations from this meeting shall be issued by the technical representatives and copied to the Owner and Architect.
 - 2. Written certification from each flooring manufacturer that condition of sub-floor is acceptable for flooring installation shall be issued and copied to the Owner and Architect.
 - 3. If a slab sealer or other remedial work is required to make the condition of the sub-floor acceptable for the flooring installation, slab preparation and slab sealer product installation shall be field reviewed by the manufacturer's technical representatives and application tested (thickness, adhesion, etc) to confirm compliance with product recommendations.

1.05 FIELD CONDITIONS

- A. See Section 01 00 00 - General Requirements, for minimum indoor air quality improvement requirements.
- B. Store materials for not less than 48 hours prior to installation in area of installation at a relative humidity of between 40 - 67 % and temperature between 65 degrees F to 80 degrees F, to achieve temperature stability. After installed product has cured, thereafter maintain conditions above 55 degrees F.

1.06 WARRANTY

- A. See Section 01 78 01 - Warranties, for additional warranty requirements.
- B. Provide manufacturer's product warranty against manufacturing defects and faulty workmanship for a period of three years from the date of Substantial Completion, unless otherwise indicated.

PART 2 PRODUCTS

2.01 MATS

- A. Carpet Mat Type WOM-1: Polyamide yarns and cut pile.
 - 1. Application: See Drawings.
 - 2. Critical Radiant Flux, ASTM E648 or NFPA 253: Class I
 - 3. Surface Flammability Ignition, ASTM D2859: Pass ("pill test").
 - 4. Size: 24 x 24 inches, modular tiles.
 - 5. Primary Backing: 100% Synthetic.
 - 6. Secondary Backing: Infinity RE by Mannington.
 - 7. Yarn Weight: 38 ounces per square yard
 - 8. Color: Selected by Architect from manufacturer's full line.
 - 9. Basis of Design: Ruffian II by Mannington Commercial
 - 10. Acceptable Manufacturers:
 - a. Mats Inc.
 - b. Substitutions: See 01 60 00 - Product Requirements.

2.02 ACCESSORIES

- A. Patching Compounds and Self-Leveling Underlayment: See Section 09 05 61 - Common Work Results for Flooring Preparation.
- B. Resilient Base and Flooring Transitions: See Section 09 65 00 - Resilient Flooring. Colors as selected.
- C. Adhesives: As recommended by the flooring manufacturer; first quality, water resistant, non-toxic, non-staining, compatible with materials being adhered; low VOC; CRI Green Label certified; in lieu of labeled product, independent test report showing compliance is acceptable. Adhesives and cements shall comply with flammability requirements.
- D. Flooring Transitions:
 - 1. Ceramic to mat flooring: Metal transition strip. Adjust substrate surface for resilient flooring surface to match top of ceramic tile.
 - 2. Colors and Finishes: Selected by Architect from manufacturer's full line.
 - 3. Transition configurations shall suit job conditions, subject to Architect's selection or prior approval.
 - 4. Metal Products: Schiene by Schluter-Systems.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Acceptance by Carpet Mat Subcontractors: The carpet mat installer shall inspect the condition of substrates prior to commencement of work and shall notify the Architect immediately of any conditions that could adversely affect the carpet mat installation. Commencement of work without such notification shall be taken as acceptance of adequacy of the substrates and carpet mat installation environment.
- B. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive carpet mat. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesives to sub-floor surfaces.

3.02 CONCRETE SLAB PREPARATION AND MOISTURE TESTING

- A. See Section 09 05 61 - Common Work Results for Flooring Preparation.
- B. Concrete slab shall be properly finished, cured in compliance with the surfacing manufacturer's specifications. Curing compounds, hardeners, and sealers shall not be allowed on the concrete slab.
- C. Any conditions that could adversely affect the flooring installation shall be corrected, prior to proceeding with the Work. Commencement of the installation of flooring shall be considered acceptance of the concrete slab as being suitable for the intended application. Any conditions that could adversely affect the flooring installation shall be brought to the Contractor's attention, for resolution, prior to proceeding with the Work.
- D. All flooring surface transitions shall be as smooth and level as possible. Resilient flooring shall be laid flush with all adjacent flooring materials. Fill edge of subfloor adjacent to higher flooring with approved crack and leveling filler as required to provide a smooth transition. Filler shall be feathered back to subfloor a minimum of one foot for each 1/16" of thickness.
- E. Prohibit traffic until filler is cured.

3.03 INSTALLATION

- A. Starting installation constitutes acceptance of sub-floor conditions. Do not begin installation until all unsatisfactory substrate conditions have been corrected and the work of other trades, including painting, has been completed. Comply with the carpet manufacturer's written installation instructions for preparing substrates and carpet installation.
- B. Install carpet tile mat products in accordance with manufacturer's instructions and CRI Carpet Installation Standard. Apply surface sealer if recommended by carpet manufacturer.
- C. Install carpet mat goods in accordance with accepted seaming diagram. Install carpet mat titles in accordance with required lay pattern.
- D. Coordinate the installation of mats with thresholds and transition strips furnished and installed by other trades.
- E. Mats shall completely cover (wall-to-wall) areas so scheduled.
- F. Mat manufacturer's release-bond adhesive shall be applied with a notched towel as recommended by the manufacturer.
- G. Installation area shall remain free of all traffic for a minimum of 24 hours and from wheeled traffic for a minimum of 72 hours, or as otherwise recommended by the flooring manufacturer.

3.04 PROTECTION

- A. Provide protection for all mats until Substantial Completion.

END OF SECTION

SECTION 31 23 15
BUILDING PAD EARTHWORK

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Provide all labor, materials, equipment and services, etc. and perform all operations necessary for building pad earthwork required for the execution of all construction as indicated on the Drawings, Specified herein, or otherwise required for a complete and proper job.
- B. The building pad area is defined as the building area to ten (10) feet outside of the proposed building footprint, including attached walkways, canopies, sidewalks, loading docks, retaining walls, and any other such appurtenances that are necessary for construction of the building.
- C. Only fill material defined herein and in the Geotechnical Engineering Report prepared for the Project by Judson Zachar P.E. of John Turner Consulting Inc, Dover, New Hampshire. titled, "Proposed Portsmouth Police Station Addition, 1 Junkins Avenue, Portsmouth New Hampshire, March 10, 2017", shall be used as backfill for all foundation excavations and fill within the building pad as defined above. All organic laden soils, undocumented fill, intersecting utilities, abandoned foundations and other questionable matter shall be removed from the building pad and Footing Zone of Influence to the parent glacial soils. The Footing Zone of Influence is defined as one (1) foot horizontally from the edge of the footing and then downward and outward at a 1H:1V slope.
- D. Subsurface investigations and reports have been executed, and the results are available for the Contractor's general information only. The Architect and Owner assume no responsibility for their completeness, accuracy, or correctness.
- E. Excavations shall be undertaken by the Contractor until the naturally occurring undisturbed glacial deposits are encountered at or below the estimated bearing levels. The Geotechnical Engineer shall determine the acceptability of bearing surface and determine requirements for compaction, additional removals and refills.
- F. Dewatering may be required. Maintain water levels a minimum of one (1) foot below construction work surfaces. Surface water shall be immediately removed from excavations.

1.02 RELATED REQUIREMENTS

- A. Section 02 32 10 - Subsurface Explorations.
- B. Section 02 41 00 - Building & Selective Demolition: Demolition of building and site elements.
- C. Division 31 - Earthwork

1.03 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data on all manufactured products including filter fabric and aggregate products (sieve analysis).
- C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- D. If dewatering is required, the Contractor shall submit their proposed dewatering methods to the Geotechnical Engineer at least two (2) weeks prior to implementation. See Section 31 23 19 - Dewatering.
- E. If underpinning is required, a technical submittal shall be submitted by the Contractor to the Geotechnical Engineer, outlining the proposed protection of the existing building. See Division 31.

1.04 TESTING AND INSPECTIONS

- A. See Section 01 40 00 – Quality Requirements.
- B. Testing Agency Services Provided by the Owner: Testing and inspections shall be performed as required by the building code, the Contract Documents, or as otherwise directed by the Architect. The Owner shall employ a Testing Agency and the Geotechnical Engineer for the

- purpose of testing and inspecting existing site soil conditions, fill materials, fill placement, and load-bearing requirements.
- C. The following testing and inspections shall be conducted prior to field compaction:
 - 1. During and following excavation, the Geotechnical Engineer shall verify the suitability of existing soils, verify design bearing capacity, and promptly notify the Owner, Contractor, and Architect of any variances.
 - 2. During placement and compaction activities, compliance with the recommendations of the Geotechnical Report for fill materials and maximum lift thickness shall be verified.
 - 3. At least one week prior to compaction, at least one test shall be made on a representative sample of each borrow material that will be incorporated in compacted earthwork to confirm gradation, per ASTM D422 and moisture density characteristics per ASTM D1557.
 - D. The following testing and inspections shall be conducted after field compaction to determine the actual in-place densities being attained.
 - 1. Perform field in-place density tests in accordance with ASTM D2922 (nuclear method).
 - 2. Verification and approval of footing and slab subgrades shall be performed by the Geotechnical Engineer prior to the placement of any required fill material or foundation forms.
 - 3. Building slab areas shall be tested at each compacted fill and backfill layer, with at least one in-place density test for every 2,000 sq. ft., but in no case fewer than three (3) tests.
 - 4. Foundation wall backfill shall be tested at each compacted backfill layer with at least one in-place density test for each 100 feet or less of wall length, but no fewer than two (2) tests along a wall face.
 - E. When the Testing Agency reports that fills, or backfills are below specified density, corrections shall be made, and all re-tests shall be at the expense of the Contractor.
 - F. Such inspections and tests shall not relieve the Contractor of responsibility for providing his own inspections, quality control and materials and fabrication procedures in compliance with specified requirements. Any non-compliant materials shall be removed and replaced at the Contractor's expense.
 - G. The Contractor shall cooperate with and facilitate testing and inspection by the Testing Agency. The Contractor shall, at his own expense, furnish the Testing Agency, upon request, with the following:
 - 1. Representative samples for testing.
 - 2. Assistance for testing materials and proper facilities for inspection of the Work.
 - 3. Access to the pit for Testing Agency inspection and testing, if required.
 - H. The Contractor shall arrange and coordinate all testing and inspections and shall give the Testing Agency adequate advance notice.
 - I. Testing Agency Services Provided by the Contractor: The Contractor shall provide and pay for certification testing, including but not limited to gradation analysis, for all imported fill materials submitted to the Architect for approval.
 - 1. The Contractor shall notify the Architect at least seven (7) working days in advance of intention to import material.
 - 2. If materials change in composition from that originally submitted by the Contractor, new gradation tests and moisture/density testing shall be conducted on soil samples. The cost of such re-testing shall be the responsibility of the Contractor.
 - 3. The Contractor shall re-compact, remove and replace, and re-test, all Work for which test results fail to meet Project requirements at no cost to the Owner.
 - J. Do not allow or cause any of the Work performed or installed to be covered up or enclosed by Work of this Section prior to all required inspections, tests, and approvals. Should any of the Work be so enclosed or covered up before it has been approved, the Contractor shall uncover all such Work at no additional cost to the Owner. After the Work has been completely tested, inspected and approved, make all repairs and replacements necessary to restore the Work to the condition in which it was found at the time of uncovering, all at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 PRODUCTS

- A. Clean Granular Fill: Consisting of bank-run sand and gravel, free of organic materials, snow, ice or other unsuitable materials and graded within limits as follows:

<u>Sieve Size:</u>	<u>Percent Passing by Weight:</u>
3 inch	100 %
3/4 inch	60-90 %
No. 4	20-70 %
No. 200	2-8 %

1. Applications:

- For below interior slabs-on-grade.
- For below exterior and interior slabs-on-grade exposed to frost, the No. 200 sieve shall have less than 12% fines based on the sand fraction.
- For backfill at footing and foundation walls.

- B. Structural Fill: Consisting of bank-run sand and gravel, free of organic materials, snow, ice or other unsuitable materials and graded within limits as follows:

<u>Sieve Size:</u>	<u>Percent Passing by Weight:</u>
5 inch	100 %
3/4 inch	60-100 %
No. 4	20-80 %
No. 200	0-10 %

1. Applications:

- For use as structural load support below the foundations including zone of influence.
- For use as backfill behind unbalanced foundation / retaining walls.

- C. Crushed Stone: 3/4 inch clean crushed stone; No. 200 sieve shall have with less than 20% fines based on the sand fraction.

1. Application: Wet conditions in areas of structural support below the foundations.

- D. On-Site Excavated Soil: Glacial till soils are not expected to be suitable for re-used as Structural Fill below foundations. However, these soils may be suitable for used for foundation backfill against a balanced foundation wall or Common Fill around the site. Use of these soils is contingent upon them being segregated from the organic laden soils, screened of stones larger than 6-8 inches, being capable of compaction to specified density at proper moisture content and approved for such use by the Geotechnical Engineer of Record.

- E. Common Fill: Well-graded, mineral, sandy or gravelly soil, predominantly free from organic matter, plastic, metal, wood, cinders, asphalt, brick, concrete, trash, ice, snow, debris, other deleterious materials, and weak compressible materials. It shall have the characteristic that it can be readily placed and compacted. The Contractor shall mechanically screen or process on-site soils to remove over-sized and deleterious materials prior to reuse as required or directed by the Geotechnical Engineer.

<u>Sieve Size:</u>	<u>Percent Passing by Weight:</u>
6 inch	100 %
3/4 inch	60-100 %
No. 4	20-85 %
No. 200	0-25 %

1. Applications: For use as common/subgrade fill in parking areas and roadway embankments.

- F. Geotextile (Filter Fabric): 4.5 ounce/sq yd minimum, needle-punched, non-woven, synthetic, chemically resistant non-biodegradable fabric. Geotextile shall be used to prevent fine-grained soils from migrating into coarse grain materials as judged necessary by the Geotechnical Engineer.

1. Product: 140N by Mirafi.

2. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 - EXECUTION

3.01 GENERAL

- A. Familiarization: Prior to all Work of this Section, the Contractor shall become thoroughly familiar with the site, the building and site conditions, and all portions of the Work covered by this Section. The Contractor shall satisfy himself, by actual examination of the site of the Work, as to the existing conditions, contours and elevations and the amount of Work required under this Section.
- B. Conditions: The Contractor acknowledges that he has satisfied himself as to the nature and location of the Work, the general and local conditions, particularly those bearing upon site access and transportation, disposal, handling, and storage of materials, availability of labor, water, electric power, roads and uncertainties of weather, ground water table or similar physical character of equipment and facilities needed prior to and during the prosecution of the Work and all other matters which can in any way affect the Work or the cost thereof under this Contract. Any failure by the Contractor to acquaint himself with all available information concerning these conditions will not relieve him from responsibility for estimating properly the difficulty and cost of successfully performing the Work.
- C. Coordinate the building pad earthwork in accordance with the Drawings, Geotechnical Report recommendations, field measurements, manufacturer's data, trade practices, and as specified herein.
- D. Remove all pavement, trees, shrubs, saplings, brush, vines, stumps and other debris as required.
- E. Stripping of Unsuitable or Surplus Materials: All topsoil, peat, organic materials, debris, frozen or saturated soils, muck, loose or disturbed soils, pre-existing fills, any other fills that cannot be compacted properly or other unsuitable or surplus materials shall be stripped to their entire depths from building pad area. All excavations shall be performed in a manner to minimize the disturbance of underlying natural ground to remain.
- F. All excavations whether cut, general excavation, or trenching shall conform to the following provisions as applicable:
 1. Extent: Excavation shall be performed to elevations and dimensions indicated or implied, plus sufficient space to permit erection of forms, shoring, drains, construction of structures, and the inspection of the Work. Excavations shall extend beyond the indicated or implied limits if necessary to remove all traces of loam, peat, waste, or other unsuitable materials. Excavation shall include all trenching required for the installation of items where the trenching is not specifically described on the Drawings or in other Sections of these Specifications.
- G. Cold Weather Excavation: Do not excavate to full indicated depth when freezing temperatures may be expected, unless fill materials, footings or slabs can be placed immediately after the excavation has been completed. Protect the excavation from frost if placing of concrete or additional fill for compaction is delayed.
 1. Where footings and slabs are exposed to freezing temperatures, they shall be protected to prevent frost penetration into the subbase and subgrade beneath the concrete.
 2. Fill shall not be placed over frozen sub base or subgrade material. Soil that is frozen shall be removed prior to placement of compacted fill. Remove all frozen uncompacted fill prior to placing additional fill for compaction. Placement of compacted fills shall not be conducted when air temperatures are 30 degrees F, or below, to prevent moisture in the fill from freezing before placement.
- H. Maintain a dewatered and stable subgrade during construction. Efforts shall be made to prevent surface water run-off from collecting in excavations. Subgrade fills that become unstable shall be removed and replaced with granular fill or as recommended by the Geotechnical Engineer.

- I. Dewatering:
 1. Dewatering is expected to be required to permit construction in the dry. The groundwater level shall be lowered prior to excavation to a minimum of one (1) foot below construction work elevation. The proposed dewatering system shall be reviewed by the Geotechnical Engineer prior to implementation by the Contractor.
 2. Provide and maintain at all times during construction, ample means and devices with which to promptly remove and dispose of all water from every source entering the excavations or other parts of the Work. Dewater by means that will ensure dry and stable excavations, the preservation of the final lines and grades of bottoms of excavations, and minimize disturbance of underlying natural ground. Provide adequate pumping equipment, including standby equipment.
 3. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
 - a. Do not place, spread, or roll any fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory to the Architect.
 - b. Provide berms or channels to prevent water from entering excavations, ponding on prepared subgrades, and flooding Project site and surrounding area. Promptly remove all water collecting in depressions.
 - c. If the excavation to subgrade has been softened or damaged by erosion, flooding, placement during unfavorable weather or other causes, remove all disturbed and saturated soils, re-fill and re-compact as specified. Following the Geotechnical Engineer's approval, crushed stone, approximately 3/4" average size, completely wrapped in filter fabric may be used to stabilize subgrade soils. Perform work to repair the subgrade prior to proceeding with the normal course of the Work on the subgrade.
 4. The engineering, construction, maintenance and removal of all berms, cofferdams and all other systems required for excess water control and diversion shall be the sole responsibility of the Contractor.
 5. Dispose of water pumped or drained from construction site in a legal and suitable manner to avoid public nuisance, injury to public health, damage to public and private property, and damage to the Work completed or in progress.
 - a. The drainage of all water resulting from pumping shall be recharged into the ground in a nearby excavation, to the extent feasible. Discharge to municipal storm drain systems shall be performed only with approval of the Architect and in accordance with all regulations and required permits.
 - b. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey runoff and water removed from excavations to collecting areas. Do not use trench excavations as temporary drainage ditches.
 - c. Water shall pass through a sediment trap prior to discharge.

3.02 STABILITY OF EXCAVATIONS

- A. The Contractor is solely responsible for the protection of the excavations.
- B. Provide shoring, sheeting, and/or bracing of excavations as required to assure complete safety against collapse of earth at sides of excavations. Alternatively, lay back excavations to a stable slope.
- C. Comply with local, and State safety regulations and with the provisions of the Occupational Safety and Health Act (OSHA).

3.03 SUBGRADE EXCAVATION AND PREPARATION

- A. Variable fill was encountered in test borings throughout the site. Test boring refusal was encountered at variable depths from 8.5 to 19 feet, suggesting a sloping and undulating bedrock or large boulder contour. The organic laden soils, undocumented fills, intersecting utilities, abandoned foundations and other questionable matter shall be removed from the building pad and footing zone of influence.

- B. Protection of Existing Foundations: Excavation along existing building walls, footings and within the Existing Footing Zone of Influence for these footings, shall be conducted in a manner that does not encroach or disturb footings or their bearing subgrades.
 - 1. The Existing Footing Zone of Influence is defined as that area extending one foot from the edge of the footing then projecting laterally outward and downward at a 1.5 H:1V angle.
 - 2. Underpinning may be required if the existing foundation needs to be undermined to accommodate new construction. An imaginary line drawn between the lower edges of adjoining footings shall not have a steeper slope than 25 degrees (2H:1V) with the horizontal unless the material supporting the higher footing is braced or otherwise retained.
 - 3. If underpinning is required, a technical submittal shall be submitted by the Contractor to the Geotechnical Engineer, outlining the proposed protection of the existing building.
- C. Excavation shall be conducted to expose natural glacial till (parent) subgrade soils.
- D. Inspection of Subgrades: Notify the Geotechnical Engineer and Architect when excavations have reached required parent subgrade prior to the placement of any fill material or concrete formwork. The Geotechnical Engineer shall assess foundation excavation and preparation efforts to determine compliance with recommendations of the geotechnical report. Do not cover subgrades until accepted by the Geotechnical Engineer. Should bearing materials at subgrade be determined to be unsuitable, continue excavation until suitable bearing materials are encountered, as determined by the Geotechnical Engineer. Replace excavated material with Structural Fill as directed by the Geotechnical Engineer. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities as directed by the Geotechnical Engineer, at no cost to the Owner.
- E. Proof-rolling of parent subgrade soils shall be conducted with at least six (6) passes of a vibratory compactor with a minimum 950 pound static weight, operating at peak energy. During the proof rolling process, the subgrade shall be observed by the Geotechnical Engineer to identify areas exhibiting weaving or instability which shall be removed and replaced with Structural Fill. Proof-rolling shall not be used when the subgrade is wet, as this may result in soil pumping and instability.
- F. Groundwater table shall be continuously maintained at least one (1) foot below construction grade until backfilling is completed. If wet subgrade or seepage conditions exist, a 6 inch base of 3/4 inch minus crushed stone encased in geotechnical fabric shall be placed immediately atop the undisturbed earthen subgrade, then tamped with a plate compactor to exhibit stable condition. Such crushed stone protects the wet subgrade, facilitates dewatering and provides a stable and dry base of foundation construction.
- G. Protection of Bearing Surfaces and Groundwater Control: The glacial till soils are considered highly susceptible to disturbance by water and worker traffic. Care shall be taken to prevent surface water from collecting on exposed bearing surfaces. Traffic over bearing surfaces shall be minimized and storm run-off shall be directed away from construction areas. The extent of exposed subgrade shall be minimized if inclement weather is forecast.
 - 1. Soils which become softened/disturbed during construction will be rendered unsuitable for structural bearing support.

3.04 FILLS AND COMPACTION

- A. Clean Granular Fill and Structural Fill Compaction:
 - 1. To the extent practicable, each layer of fill shall be compacted to the specified density the same day it is placed. Fill that is too wet for proper compaction shall be dried to the proper moisture content, or removed and replaced.
 - 2. Structural Fill shall be placed systematically in horizontal layers not to exceed 8 inches thickness for plate compactors (less than 500 lb. static weight and shall not exceed 12 inches for self-propelled compactors. Compaction equipment in open areas shall be large self-propelled vibratory rollers with a minimum compactive energy of 25,000 lbs. In confined areas, hand operated vibratory plate compaction equipment or a walk behind

- vibratory roller shall be used with a maximum placed layer of six (6) inches. A minimum of 6 systematic passes of compaction equipment shall be used to compact each lift.
3. All Structural Fill placed within the building pad to the bottom of slab elevation shall be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557.
 4. Only Structural Fill shall be used as backfill for all foundation excavations and fill within the building pad as defined above. Structural Fill shall extend to the lateral limits defined as 1 foot horizontally and then 1 horizontal and 1 vertical line sloped down and outward from the bottom outside edge of foundations and floor slabs supported by fill (Footing Zone of Stress Influence).
 5. Compaction Around Structures: No heavy machinery shall be allowed within five (5) feet of the structure during placing. Material shall not be placed until slabs have been poured and set and the structure can satisfactorily withstand the loads imposed by fill and backfill. Only Structural Fill shall be used as backfill of footings, piers and foundation walls. Backfills at structures shall be brought up evenly on all sides to avoid damage to the structure by uneven loading. All lifts shall be properly compacted.
 - a. Use extra care when compacting adjacent to walls. Where walls are buried on both sides, backfill and compaction shall proceed on both sides of the wall so that the difference, in top of fill level on either side of the wall shall not exceed two (2) feet at any stage of construction. Where backfill of buried wall is only on one side, only a hand-operated roller or plate compactor shall be used within a lateral distance of five (5) feet of back wall for walls less than fifteen (15) feet high and within ten (10) feet of back of wall for walls more than fifteen (15) feet high.
 6. Backfill excavations, promptly, but not before completing the following:
 - a. Acceptance of construction below finish grade including waterproofing, foundation drains and perimeter insulation.
 - b. Surveying locations of underground utilities for record documents.
 - c. Testing, inspecting, and approval of underground utilities.
 - d. Concrete formwork removal.
 - e. Removal of trash and debris from the excavation.
 - f. Removal of temporary shoring and bracing, and sheeting.
 - g. Installing permanent or temporary horizontal bracing on horizontal supported walls.
 7. Frozen materials shall not be placed in the backfill nor shall materials be placed upon frozen materials. Previous frozen materials shall be removed or shall be otherwise treated as required before new backfill is placed.
 8. Any Fill material that is placed below or around the building foundations or below pavement areas that does not meet the requirements as stated herein or within the Geotechnical Engineering Report without prior approval from the Geotechnical Engineer, becomes unstable during compaction efforts due to excess moisture, or becomes saturated due to precipitation shall be removed and replaced as directed by the Geotechnical Engineer at no cost to the Owner.

3.05 PREPARATION FOR SLABS

- A. Sub-base:
 1. Place a minimum (9) nine inch thick layer of Clean Granular Fill, below the bottom of interior concrete floor slabs.
 2. Place a minimum (15) twelve inch thick layer of Clean Granular Fill, below the bottom of exterior concrete slabs and sidewalks.
 3. Place a minimum (24) twenty-four inch thick layer of Clean Granular Fill, below exterior slabs at building entrances.
 4. Clean Granular Fill shall be compacted to at least 95 percent of the maximum dry density as determined by ASTM D1557.

3.06 OFF-SITE DISPOSITION OF EXCESS EXCAVATED SOILS

- A. The Contractor shall manage and legally dispose off-site all excess or unsuitable generated materials that cannot be reused on-site.

1. Excess or unsuitable excavated materials shall be removed from the site and transported to appropriate facilities or locations in accordance with all local, state, federal regulations, the RCMP, and the requirements herein. All excavated excess or unsuitable materials will become the property of the Contractor. Materials excavated from the site shall not be transported or used at schools, public parks, residential properties, day care facilities or other environmentally-sensitive site. Prior to removal of excavated materials from the site, the Contractor shall notify the Owner of the proposed disposal site(s) and receive approval from the Owner prior to removal and disposal of the materials. All excavated materials proposed for off-site disposal or reuse shall be tested in accordance with the requirements of the receiving facility at the Contractor's expense. If off-site reuse or disposal is proposed at a location other than a licensed treatment or disposal facility, soil shall be tested in accordance with requirements set by the Engineer.
2. The Contractor shall coordinate and contract with applicable receiving facilities and complete all associated paperwork. Copies of all associated paperwork shall be provided to the Owner within seven (7) days of removal of the material from the site.
3. Excavated soils and materials removed from the site shall be loaded within the site limits. All trucks leaving the site shall be covered and cleaned of debris that might fall from the trucks during transport.
4. The Contractor shall take measures to prevent debris or water from being spilled from trucks or tracked from the site onto local streets. The Contractor shall sweep off-site streets as necessary or as directed by the Owner.

END OF SECTION

APPENDIX “A”



GEOTECHNICAL ▼ ENVIRONMENTAL ▼ RESIDENT ENGINEERING ▼ TESTING

GEOTECHNICAL INVESTIGATION REPORT

PROPOSED PORTSMOUTH POLICE STATION ADDITION 1 JUNKINS AVENUE PORTSMOUTH, NEW HAMPSHIRE

Prepared For:

Department of Public Works
City of Portsmouth
680 Peverly Hill Road
Portsmouth, NH 03801

Prepared By:

John Turner Consulting, Inc.
19 Dover Street
Dover, New Hampshire 03820
www.ConsultJTC.com

JTC Project No.: 17-15-009

March 10, 2017

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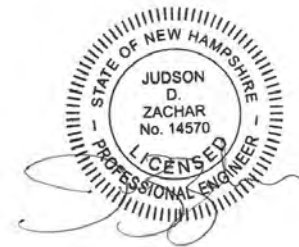
Report Text, Limitations, and Tables

GEOTECHNICAL INVESTIGATION REPORT

Prepared by:

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FROM: Rachel Cannon
Staff Geotechnical Engineer

Judson Zachar, P.E.
Senior Geotechnical Engineer

DATE: March 10, 2017

**RE: GEOTECHNICAL INVESTIGATION REPORT
PROPOSED PORTSMOUTH POLICE STATION ADDITION
1 JUNKINS AVENUE
PORTSMOUTH, NEW HAMPSHIRE
JTC Project No. 17-15-009**

John Turner Consulting, Inc. (JTC) is pleased to present this *Geotechnical Investigation Report* for the proposed Portsmouth Police Station Addition, to be located at 1 Junkins Avenue in Portsmouth, New Hampshire. JTC conducted geotechnical explorations, laboratory testing, and engineering evaluations in general accordance with our proposed scope of services submitted to City of Portsmouth Department of Public Works (DPW) on February 6, 2017. Our work was authorized on February 15, 2017.

The purpose of the geotechnical investigation was to obtain information on the subsurface conditions at the site and to provide geotechnical engineering recommendations to support the planning, design, and construction of the proposed development. Geotechnical explorations and laboratory testing services were performed in February of 2017.

This report summarizes available project information, presents the geotechnical exploration and laboratory testing programs, describes the subsurface conditions encountered, and provides geotechnical engineering recommendations to support the planning, design, and construction of

the proposed Portsmouth Police Station Addition. The contents of this report are subject to the attached *Limitations*.

1.0 PROJECT INFORMATION

The following subsections provide general descriptions of the site, the regional geologic setting, and the proposed development.

1.1 Site Description

Presently, the site is occupied by City of Portsmouth Town Hall and the Portsmouth Police Department buildings, and associated asphalt-concrete-paved parking, driveway, walkway, and landscape areas. The site is bordered by South Mill Pond to the north, Junkins Avenue to the west, and developed land/residences to the south and east. A *Site and Survey Plan* (attached) provided by DPW and dated December 16, 1975 indicates relatively flat ground surface contours with existing grades ranging from about +43 feet to +45 feet within the footprint of the proposed development.

1.2 Regional Geologic Setting

JTC's review of the "Surficial Geologic Map of the Portsmouth and Kittery Quadrangles Rockingham County, New Hampshire" (Larson, Graham J., 1992) indicates that the site soils are characterized by Glacial Till, which are described as a mixture of sand, silt, clay, and gravel deposited by glacial ice. The Glacial Till typically overlies bedrock.

1.3 Proposed Development

JTC understands that the proposed project involves the construction of an addition onto the west side of the existing police station. We understand that design details are still being developed, but that the intent is to support the addition on a conventional shallow spread footing foundation with a concrete floor slab-on-grade (and no basement).

A *Site Plan* (attached) provided by Lavallee Brensinger Architects and dated February 17, 2017 indicates a building finish-floor elevation (FFE) approximately coincident with existing grades such that only minor cuts and/or fills will be required for the proposed development. Site-specific structural loading was not available at the time of this report. As such, JTC has assumed the following structural loading conditions based on our experience with similar developments:

- Strip/wall footing loads will be on the order of 3 kips per linear foot or less;
- Column loads will be on the order of 75 kips or less; and
- Live loads applied to the floor slab-on-grade will be on the order of 125 pounds per square foot (psf) or less.

2.0 GEOTECHNICAL EXPLORATIONS & LABORATORY TESTING

The primary components of the geotechnical exploration and laboratory testing programs are described in the following subsections.

2.1 Geotechnical Explorations

JTC subcontracted Soil Exploration Corp (SoilEx) to perform two (2) geotechnical test borings (designated as B-1 and B-2) via a truck-mounted Mobil B-57 drill rig. JTC directed the drilling, testing, and sampling activities and logged the subsurface conditions encountered at each exploration location.

The exploration locations were selected by the City of Portsmouth in relation to the existing site features and proposed development, and under the constraints of drill rig access and utility conflicts. Subsequently, the relative location of each exploration was established via measurements from existing site features and scaling the dimensions onto the provided plan(s). The two exploration locations were finalized outside of the proposed addition footprint; B-1 was located on the west side of the existing building just outside of the proposed addition footprint and B-2 was located on the east side of the existing building near a possible future project and therefore marginally considered during this geotechnical investigative report. The attached *Test Boring Location Plan* depicts the approximate exploration locations.

The test borings were advanced to depths ranging from 8.5 to 19 feet below the ground surface (bgs) utilizing 4¼-inch inside-diameter continuous-flight hollow-stem-augers (HSAs). As the borings were advanced, standard penetration tests (SPTs) were conducted at regular intervals and soil samples were obtained via 2-inch outside-diameter split-spoon samplers driven by a 140-pound automatic hammer. SPTs were performed in general accordance with ASTM D1586, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Soil samples were sealed in moisture-tight containers and returned to JTC's office for further review, classification, and/or geotechnical laboratory testing. The test borings were backfilled with soil cuttings and imported fill upon completion of drilling. The necessity of imported fill in addition to the soil cuttings is indicative of numerous subsurface voids developed during the drilling procedure within the Existing Fill material.

Detailed records of the drilling, testing, and sampling performed and the soil, bedrock, and groundwater conditions observed at each test boring location are provided on the attached *Test Boring Logs*.

2.2 Geotechnical Laboratory Testing

JTC selected representative soil samples for geotechnical laboratory testing at our in-house laboratory. The following tests were performed:

- 2 Moisture contents;
- 2 Particle-size analyses; and

Geotechnical laboratory testing was performed in general accordance with ASTM procedures. Test results are provided on the attached *Geotechnical Laboratory Testing Reports*.

3.0 SUBSURFACE CONDITIONS

The following subsections describe the site soil, bedrock, and groundwater conditions encountered, based on results of the geotechnical explorations and laboratory testing. Detailed descriptions of the conditions observed at each test boring are provided on the attached *Test Boring Logs*.

3.1 Soils

The overburden soils encountered at the test boring locations appear to be consistent with those described by the published geologic data. The primary soil strata are briefly described in the paragraphs below.

3.1.1 Existing Fill

Existing Fill materials were encountered directly beneath 4 to 5 inches of asphalt at each test boring location. The Fill consisted of brown silty sand with gravel (SM) and contained frequent cobbles and boulders. JTC assumes that the cobbles and boulders are ledge fill or rubble from bedrock removed from within the footprint of the existing building during construction. Based on conditions observed during drilling, sampling activities, and backfilling procedures, JTC assumes there are voids between the cobbles and boulders. The Fill extended to depths of about 10 feet bgs at boring location B-1, and about 5 feet bgs at boring B-2. The Fill was typically medium dense to dense.

3.1.2 Glacial Till

Olive brown silty fine to medium sand (SM) was encountered beneath the Existing Fill at each boring location at depths ranging from 5 to 10 feet bgs. This stratum contains few gravel and is interpreted to be Glacial Till. The Glacial Till varied from about 1.5 to 9 feet in thickness and extended to depths ranging from 6.5 to 19 feet bgs.

The Glacial Till was typically described as medium dense to dense based on N-values that ranged from 24 to 33 and averaged about 28. One (1) particle-size analyses performed on representative samples of Glacial Till indicated 10% gravel, 43% sand, and 47% silt. The in-situ moisture content was about 11%, based on one (1) test.

3.2 Bedrock

Practical refusal to further penetration of the augers and/or split-spoon sampler was encountered at each exploration at depths ranging from about 8.5 to 19 feet bgs. Weathered Bedrock was encountered in boring B-2 at a depth of 6.5 feet bgs and was augered into for about 2 feet (with practical refusal at 8.5 feet bgs). The refusal in each exploration is interpreted to be refusal on the

probable top of bedrock. Based on conditions observed during drilling, JTC assumes, at minimum, the top two feet of bedrock is friable.

Bedrock is not anticipated to be an issue for this project.

3.3 Groundwater

Groundwater and/or wet soils were not encountered in either of the two borings at the time of drilling. Short-term (i.e., during drilling, upon completion of drilling, and/or a few hours after drilling) water levels observed in test borings performed in clay and/or dense glacial soils should be considered approximate.

JTC estimates that this investigation occurred during a period of seasonally normal ground water. Site groundwater levels should be expected to fluctuate seasonally and in response to precipitation events, construction activity, site use, and adjacent site use.

4.0 GEOTECHNICAL DESIGN & CONSTRUCTION RECOMMENDATIONS

The evaluation of the site and the proposed development was based on the subsurface conditions encountered at the geotechnical test borings, results of geotechnical laboratory testing, provided site/grading plans, and assumed/preliminary structural loading conditions, as described herein. JTC believes that the proposed building can be supported upon shallow foundations bearing on undisturbed native Glacial Till and/or on *Structural Fill* or crushed stone built-up from properly prepared native soils, provided that the design and construction recommendations presented herein are satisfied.

4.1 Site Preparation and Grading

Site preparation and grading should be performed in accordance with the following procedures:

- A geotechnical engineer should directly observe site preparation and grading activities;
- The site soils contain substantial proportions of fine sand and silt, and may degrade and/or become unworkable when subjected to construction traffic or other disturbance during wet conditions. As such, site preparations, grading, and earthworks should be performed during a dry season if possible. The Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, grading (and compacting) exposed subgrades to promote surface water run-off, and maintaining an effective dewatering program, as necessary. Over-excavation to remove degraded or unworkable subgrade soils should be anticipated and budgeted (cost and schedule);
- Any existing buildings, structures, and/or associated foundations (including footings, foundation walls, slabs-on-grade, and/or basements) should be completely removed from proposed building and pavement areas and replaced/backfilled with properly placed and

compacted *Structural Fill*;

- Any existing subsurface utilities and underground structures should be completely removed from the footprint of the proposed building and replaced/backfilled with properly placed and compacted *Structural Fill*. Any existing subsurface utilities in proposed pavement areas should be removed and/or appropriately abandoned in place (e.g., pressure grouting), as approved by the on-site geotechnical engineer;
 - The site should be cleared and stripped of any existing asphalt-concrete pavement not designated to remain; existing trees/vegetation not designated to remain; Topsoil, rootmat, forest mat; loamy/organic-laden Subsoil; and any otherwise unsuitable materials.
 - Any existing Fill and any otherwise unsuitable materials should be completely removed from the proposed building pad (i.e., the proposed building footprint plus at least 5 feet laterally);
 - The geotechnical explorations indicate that most areas of the site are covered with 6.5 to 10 feet of existing Fill that should be replaced/backfilled with properly placed and compacted *Structural Fill*;
 - In cut areas, the final foot of excavation should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance;
 - Following clearing, stripping, and/or cutting, the exposed subgrade soils should be proof-rolled using a large (10-ton) smooth-drum roller with successive passes aligned perpendicularly. However, proof-rolling should not be performed if/when the exposed subgrade soils are wet (i.e., due to presence of groundwater, stormwater, perched water, etc.) because this may result in soil pumping and instability. Therefore, the proof-rolling efforts, including the number of passes and whether to employ static or vibratory methods, should be directed by the on-site geotechnical engineer;
 - Any loose, soft, wet, and/or otherwise unsuitable soils (typically evidenced by rutting, pumping, and/or deflection of the subgrade) should be over-excavated to expose suitable soils, or other remedial measures should be taken, as approved by the on-site geotechnical engineer; and
 - The over-excavation should then be backfilled with properly placed and compacted *Structural Fill*.
 - *Structural Fill* should be used for subgrade fill in the building pad. The placement of *Structural Fill* materials to achieve design subgrades in the building pad should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer;
 - *Common Fill* is acceptable for subgrade fill in parking and driveway areas. The placement of *Common Fill* materials to achieve design subgrades in pavement areas should not begin until the exposed subgrade soils have been directly observed and approved by the on-site geotechnical engineer; and
 - *Structural Fill* and *Common Fill* materials and placement and compaction requirements are provided in the attached *Specifications*.
-

4.2 Shallow Foundations and Walls

Based on the subsurface conditions encountered at the exploration locations and our current understanding and assumptions relative to the proposed development, the following foundation design recommendations are provided:

- The existing Fill materials are not suitable for direct support of shallow foundations. These materials should be completely removed from the footprint of the building, plus 5 feet laterally, as described in Section 4.1.
- The building can be supported on a system of continuous and/or isolated shallow spread footings bearing on undisturbed native Glacial Till and/or on *Structural Fill* or crushed stone built-up from properly prepared native soil subgrades;
- Shallow foundations may be designed using an allowable bearing pressure of 4,000 psf. Design bearing pressures may be increased by one-third ($\frac{1}{3}$) when considering seismic and or transient wind loading conditions;
- Continuous wall footings should have a minimum width of 2 feet. Isolated column footings should have a minimum width of 3 feet;
- Exterior footings should be founded at least 4 feet below the lowest adjacent grade to provide adequate frost protection. Interior footings in heated portions of the building should be founded at least 2 feet below FFE to develop adequate bearing capacity; and
 - If Bedrock is encountered during excavations for footings, the footings should be founded at a minimum depth of 2 feet below the adjacent grade, atop 9 inches of $\frac{3}{4}$ -inch minus crushed stone (cushion layer).
- For footings founded on undisturbed native Glacial Till, weathered Bedrock, and/or *Structural Fill* or crushed stone built up from properly prepared native soil/bedrock subgrades, total post-construction settlements are estimated to be on the order of 0.75 inches or less. As such, differential settlements along continuous wall footings and/or between isolated column footings could approach the actual total settlement. However, the estimated settlements and resulting angular distortion are anticipated to be within the allowable limits for this type of structure. Post-construction settlements should be complete shortly after construction is finished.

Recommendations for shallow foundation subgrade preparation and construction are provided as follows:

- A geotechnical engineer or his/her representative should directly observe foundation subgrade preparation activities;
- If shallow and/or perched groundwater is encountered, it must be continuously maintained at least 2 feet below the bottom of excavation and subsequent construction grade until the backfilling is complete;
- The native foundation subgrade soils will be sensitive to moisture and will readily disturb

or soften if exposed to wet conditions during construction activities. Therefore, the final foot, at a minimum, of excavation for foundations should be performed using a smooth-edged cutting bucket (no teeth) to minimize subgrade disturbance. Furthermore, if wet conditions are present or anticipated due to groundwater seepage, perched groundwater, and/or precipitation/stormwater, the foundation subgrade should be protected with a 6-inch (minimum) thick layer of ¾-inch minus crushed stone encased in a geotextile fabric (e.g., Mirafi 140N or equal). In this case, the crushed stone shall be placed immediately upon exposure of the native foundation subgrade soils and densified with a plate compactor until exhibiting stable conditions. The purpose of the crushed stone is to protect the fine-grained subgrade soils from disturbance, facilitate construction dewatering (if necessary), and provide a dry/stable subgrade upon which to progress construction;

- Prior to setting forms and placing reinforcing steel, a geotechnical engineer should directly observe footing subgrades;
 - Footing subgrades should be level or suitably benched and free of standing water and/or debris;
 - Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
 - Over-excavations should be backfilled with properly placed and compacted *Structural Fill* as approved by the on-site geotechnical engineer.
- Foundation subgrade soils should be protected against physical disturbance, precipitation, and/or frost throughout construction. Surface water run-on/run-off should be diverted away from open foundation excavations. The Contractor shall ultimately be responsible for the means and methods to protect the foundation subgrade during construction;
- Interior footings, piers, and/or walls and the interior side of balanced perimeter foundation walls should be backfilled with *Clean Granular Fill* and/or 3-inch minus material meeting the requirements of *Structural Fill*, as described in the attached *Specifications*;
- Exterior footings and exterior side of balanced perimeter foundation walls should be backfilled with non-frost-susceptible fill in order to mitigate potential adverse effects of frost. Exterior footing and foundation wall backfill should consist of well-graded, free-draining, granular soil conforming to the requirements of *Clean Granular Fill*, as described in the attached *Specifications*. Alternatively, a suitable bond break (such as rigid polystyrene insulation) may be provided as approved by the on-site geotechnical engineer. In this case, footings and walls (excluding unbalanced/basement walls) may be backfilled with *Common Fill* (see attached *Specifications*) having a maximum particle-size of 3 inches, as approved by the on-site geotechnical engineer;
- Backfill for footings and foundation walls should be placed in uniform horizontal lifts having a maximum loose lift thickness of 8 inches and compacted to 95 percent of its modified proctor maximum dry density (MPMDD; per ASTM D1557). Thinner lifts may be required in order to achieve the required compaction criteria; and
- To minimize the potential for foundation wall damage during the backfill and compaction activities, it is recommended that foundation wall backfill be placed in a manner that

maintains a balanced fill height on both sides of the wall (up to the final exterior grade).

4.3 Protection of Existing Foundations

JTC recommends that where the new foundation is within close proximity to the existing building, that the new footings be constructed at similar grade as the existing footings to mitigate the overlapping of stresses. An imaginary line drawn between the lower edges of adjoining/adjacent footings shall not have a steeper slope than 26.5° (2H:1V) relative to horizontal unless the materials supporting the higher footing are braced or otherwise retained. Furthermore, in no case should the FZOI of the existing foundation be encroached or disturbed without review by a Professional Engineer. The FZOI is defined as that area extending laterally 1 foot from the edge of the existing footing then projecting laterally outward and downward at a 1H:1V splay.

Data from the borings suggests that the existing foundation could be undermined during the removal of Existing Fill. As such, temporary excavation support and/or foundation underpinning may be required for that approach.

If the existing footings do need to be undermined, it is expected that conventional concrete pit underpinning will be the most practical means of support. Such underpinning involves staggered limited-width excavations beneath the existing foundation and subsequent backfilling of the pits with new concrete. The process essentially lowers the bottom of footing (BOF) of the existing foundation. It is recommended that an experienced Contractor be retained for the underpinning. The Contractor should provide a *Technical Submittal* to outline their proposed means and methods to protect the existing building and construct the new underpinning pits. JTC can provide technical assistance if underpinning or shoring is necessary for the project.

4.4 Floor Slab-On-Grade

Design recommendations for the floor slab-on-grade are provided as follows:

- A modulus of vertical subgrade reaction, k_{vi} , of 175 pounds per cubic inch (pci) should be available for structural design of floor slabs-on-grade, provided that the subgrade, *Structural Fill*, and the *Clean Granular Fill* are prepared as recommended in Subsections 4.1, 4.2, 4.3, and 4.4;
- The floor slab-on-grade should be underlain by a minimum 9-inch thick layer of *Clean Granular Fill* to provide a capillary break and a stable working surface;
- The floor slab should be isolated structurally from foundation walls and columns/piers to allow for differential movement;
- The need/desire to provide a moisture/vapor barrier beneath floor slab-on-grade should be evaluated by the architect and/or the structural engineer, based on the building's specific interior usage requirements; and

During construction, we expect that much of the building footprint will be excavated or disturbed during site preparation and grading (Subsection 4.1), excavations for shallow foundations (Subsection 4.2), and/or excavations for new underground utilities. It is imperative that the

subgrade beneath the floor slab-on-grade be reinstated with properly placed and compacted *Structural Fill* and/or prepared as recommended herein. Additionally:

- A geotechnical engineer should directly observe the subgrade soils prior to the placement of the recommended *Clean Granular Fill* base course;
 - The subgrade should be level and free of standing water and/or debris;
 - Loose, soft, wet, frozen, or otherwise unsuitable soils should either be re-compacted or over-excavated to a suitable subgrade, as approved by the on-site geotechnical engineer; and
 - Over-excavations should be backfilled with properly placed and compacted *Structural Fill*.
- The *Clean Granular Fill* base course should not be placed until the subgrade has been reviewed by the on-site geotechnical engineer. Subsequently, the *Clean Granular Fill* should be compacted to the satisfaction of the geotechnical engineer to 95% of its MPMDD.

4.5 Seismic Considerations

A site class “C” is recommended based on site class definitions of the American Society of Civil Engineers (ASCE) Standard 7-10, Minimum Design Loads for Buildings and Other Structures. The site is not considered to be susceptible to liquefaction, based on the conditions encountered at the test boring locations.

4.6 Re-Use of Site Soils

Existing Fill encountered at the exploration locations is not suitable for re-use as *Structural Fill* or *Clean Granular Fill*. These soils should be suitable for re-use as *Common Fill*, provided that it is appropriately segregated from excessive cobbles, boulders, or otherwise unsuitable existing Fill materials and/or other unsuitable materials.

Most of the Glacial Till encountered at the explorations locations should be suitable for re-use as *Common Fill*, provided that it is appropriately segregated from excessively silty, wet, and/or otherwise unsuitable Glacial Till materials and/or other unsuitable materials. The Glacial Till is not expected to be suitable for re-use as *Structural Fill* or *Clean Granular Fill*.

4.7 Construction Monitoring and Quality Control Testing

A qualified geotechnical engineer or representative should be retained to review the site preparation and grading activities and foundation subgrade preparations, at a minimum. Similarly, quality control testing, including in-place field density and moisture tests, should be performed to confirm that the specified compaction is achieved. It is recommended that JTC be retained to provide earthwork construction monitoring and quality control testing services.

Quality control testing recommendations are provided as follows:

- During site grading and foundation subgrade preparation, 3 field density tests should be

performed for every 4,000 square feet (per lift) of *Structural Fill* placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 4,000 square feet;

- During foundation wall backfilling, 3 field density tests should be performed for every 100 linear feet (per lift) of fill placement, at a minimum. At least 3 tests should be performed on each lift of material even if the lift is less than 100 linear feet;
- During placement and compaction of *Clean Granular Fill* as the base course below the floor slab-on-grade and sidewalks, 3 field density tests should be performed for every 4,000 square feet of placement. At least 3 tests should be performed on each lift of material even if the lift is less than 4,000 square feet;
- During backfilling of utility trenches, at least 1 test should be conducted on *Structural Fill* per 50 linear feet (per lift) of trench; and
- During site grading and pavement subgrade preparation, 3 field density tests should be performed for every 4,000 square feet (per lift) of *Common Fill*, at a minimum. At least 3 tests should be performed on each lift even if the lift is less than 4,000 square feet.

4.8 Additional Considerations

Additional design recommendations are provided as follows:

- Exterior concrete sidewalks shall be underlain by at least 15 inches of *Clean Granular Fill*. The thickness of the *Clean Granular Fill* shall be increased to no less than 24 inches for exterior concrete slabs located adjacent to exterior doorways and ramps to provide additional frost protection at building entry/exit points;
- Roof drains or similar features should be provided to collect roof run-off and prevent ponding near the building. Roof drains and other stormwater controls should not discharge to foundation drains;
- The exterior ground surface adjacent to the building should be sloped away from the building to provide for positive drainage. Similarly, the final surface materials adjacent to the building should be relatively impermeable to reduce the volume of precipitation infiltrating into the subsurface proximate to building foundations. Such impermeable materials include cement concrete, bituminous concrete, and/or vegetated silty/clayey topsoil; and
- Permanent fill or cut slopes should have a maximum slope of 2.5H:1V (horizontal to vertical) or flatter for dry conditions. Permanent fill or cut slopes should be no steeper than 3H:1V for wet/submerged conditions (e.g., stormwater basin) unless a properly designed surface slope stabilization system (e.g. rip rap, geosynthetics) is provided.

Additional construction considerations/recommendations are provided as follows:

- Safe temporary excavation and/or fill slopes are the responsibility of the Contractor. Excavations should be conducted in accordance with local, state, and federal (OSHA)

requirements, at a minimum. If an excavation cannot be properly sloped or benched due to space limitations, adjacent structures, and/or seepage, the Contractor should install an engineered shoring system to support the temporary excavation;

- Subgrade conditions will be influenced by excavation methods, precipitation, stormwater management, groundwater control(s), and/or construction activities. Some of the site soils are poorly-drained, moisture-sensitive, and considered susceptible to disturbance when exposed to wet conditions and construction activities. As such, the Contractor shall be aware of these conditions and must take precautions to minimize subgrade disturbance. Such precautions may include diverting storm run-off away from construction areas, reducing traffic in sensitive areas, minimizing the extent of exposed subgrade if inclement weather is forecast, backfilling excavations and footings as soon as practicable, and maintaining an effective dewatering program, as necessary;
- Proper groundwater control and stormwater management are necessary to maintain site stability. Groundwater should be continuously maintained at least 2 feet below the working construction grade until earthworks and/or backfilling are complete;
- If groundwater seepage and/or wet soils due to shallow groundwater are observed, a ¾-inch minus crushed stone base should be placed atop the exposed subgrade soils. The stone should be immediately placed atop the undisturbed subgrade and then tamped with a plate compactor until exhibiting stable conditions. The stone shall be protected, as required, with a geotextile filter fabric such as Mirafi 140N or equal. The purpose of the stone base is to protect the wet subgrade, facilitate dewatering, and provide a dry/stable base upon which to progress construction; and
- All slopes should be protected from erosion during (and after) construction.

5.0 CLOSING

We trust the contents of this report are responsive to your needs at this time. Should you have any questions or require additional assistance, please do not hesitate to contact our office.



LIMITATIONS

Explorations

1. The analyses and recommendations presented in this report are based in part upon the data obtained from widely-spaced subsurface explorations. Subsurface conditions between exploration locations may vary from those encountered at the exploration locations. The nature and extent of variations between explorations may not become evident until construction. If variations appear, it will be necessary to re-evaluate the recommendations of this report.
2. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretation of widely-spaced explorations and samples; actual strata transitions are probably more gradual. For specific information, refer to the individual test pit and/or boring logs.
3. Water level readings have been made in the test pits and/or test borings under conditions stated on the logs. These data have been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors differing from the time the measurements were made.

Review

4. It is recommended that John Turner Consulting, Inc. be given the opportunity to review final design drawings and specifications to evaluate the appropriate implementation of the geotechnical engineering recommendations provided herein.
5. In the event that any changes in the nature, design, or location of the proposed areas are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of the report modified or verified in writing by John Turner Consulting, Inc.

Construction

6. It is recommended that John Turner Consulting, Inc. be retained to provide geotechnical engineering services during the earthwork phases of the work. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

Use of Report

7. This report has been prepared for the exclusive use of the City of Portsmouth in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.
 8. This report has been prepared for this project by John Turner Consulting, Inc. This report was completed for preliminary design purposes and may be limited in its scope to complete an accurate bid. Contractors wishing a copy of the report may secure it with the understanding that its scope is limited to preliminary geotechnical design considerations.
-



TABLE 1

Recommended Soil Gradation & Compaction Specifications

Structural Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
5-inch	100
¾-inch	60 - 100
No. 4	20 - 80
No. 200	0 - 10

- NOTES:
1. For use as structural load support below the foundations. Structural Fill placed beneath building foundations should include the Footing Zone of Influence which is defined as that area extending laterally one foot from the edge of the footing then outward and downward at a 1H:1.5V splay.
 2. ¾-inch crushed stone may be used in wet conditions.
 3. Structural Fill should be free of construction and demolition debris, frozen soil, organic soil, peat, stumps, brush, trash, and refuse;
 4. Structural Fill should not be placed on soft, saturated, or frozen subgrade soils;
 5. Structural Fill should be placed in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
 6. Place and compact within $\pm 3\%$ of optimum moisture content.
 7. Compact to at least 95% relative compaction per ASTM D1557.
 8. The adequacy of the compaction efforts should be verified by field density testing
-

Clean Granular Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
3-inch	100
¾-inch	60 – 90
No. 4	20 – 70
No. 200	2 – 8

- NOTES:
1. For minimum 9-inch base below floor slabs-on-grade.
 2. For minimum 15-inch base for exterior concrete slabs exposed to frost.
 3. For minimum 24-inch base at exterior ramps, aprons, and loading bays adjacent to entrances/exit ways.
 4. For use as footing and foundation wall backfill.
 5. For use as backfill behind unbalanced foundation/retaining walls.
 6. Place in lifts not exceeding 12 inches for heavy vibratory rollers and 8 inches for vibratory plate compactors.
 7. Place and compact within $\pm 3\%$ of optimum moisture content.
 8. Compact to at least 95% relative compaction per ASTM D1557.
 9. Compaction efforts should be verified by field density testing.

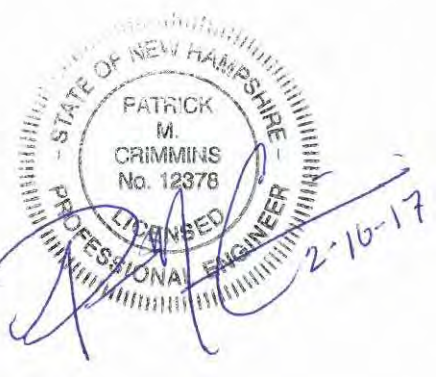
Common Fill

SIEVE SIZE	PERCENT PASSING BY WEIGHT
6-inch	100
¾-inch	60 – 100
No. 4	20 – 85
No. 200	0 – 25

- NOTES:
1. For use as common/subgrade fill in parking areas and roadway embankments.
 2. For use as foundation wall backfill if used in conjunction with a bond break and sized/screened to 3-inch minus.
 3. Place in lifts not exceeding 12 inches.
 4. Maximum stone size should not exceed $\frac{1}{2}$ the actual lift thickness.
 5. Compact to at least 92% relative compaction per ASTM D1557 when placed as subgrade fill in parking areas or roadway embankments.
 6. Compact to at least 95% relative compaction per ASTM D1557 when placed as foundation wall backfill in conjunction with a bond break.
 7. Compaction efforts should be verified by field density testing.
-

Site and Survey Plan, Site Plan & Test Boring Location Plan





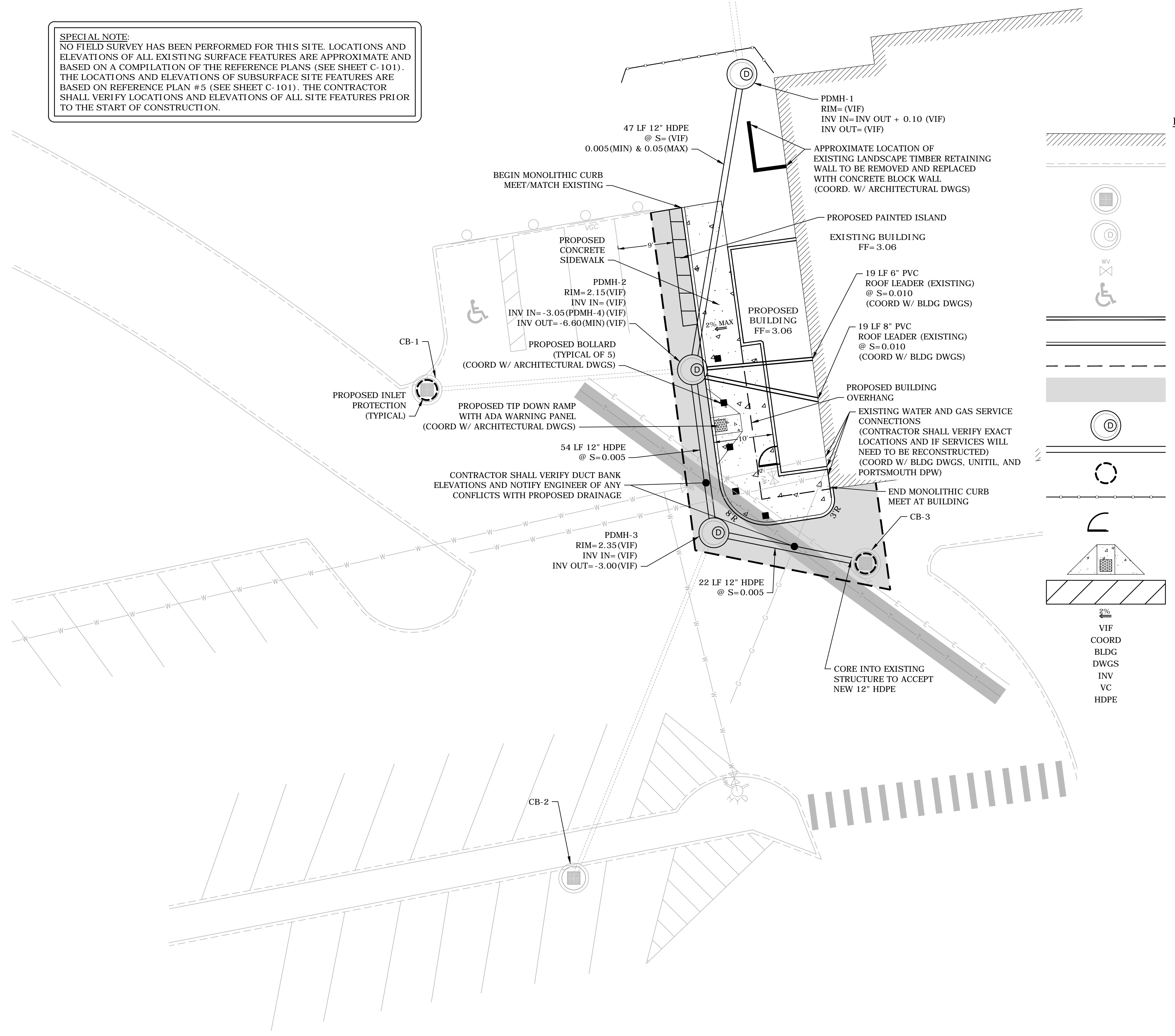
- SITE NOTES:**
- PAVEMENT MARKINGS SHALL BE INSTALLED AS SHOWN. ALL MARKINGS TO BE CONSTRUCTED USING WHITE PAVEMENT MARKINGS. ALL PAINTED PAVEMENT MARKINGS INCLUDING SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F".
 - ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
 - CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAW CUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
 - SEE ARCHITECTURAL/BUILDING DRAWINGS FOR ALL CONCRETE PADS, SIDEWALKS, RAMPS AND BOLLARDS ADJACENT TO BUILDING.
 - CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
 - COORDINATE ALL WORK ADJACENT TO BUILDING WITH BUILDING CONTRACTOR.

- GRADING AND DRAINAGE NOTES:**
- COMPACTION REQUIREMENTS:
BELOW PAVED OR CONCRETE AREAS 95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL 95%
BELOW LOAM AND SEED AREAS 90%
* ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557. METHOD C FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM-2922.
 - ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR EQUAL) OR RCP CLASS IV, UNLESS OTHERWISE SPECIFIED.
 - ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
 - CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMPS AND AREAS ADJACENT TO THE BUILDING.
 - ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
 - ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NH DOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.

- EROSION CONTROL NOTES:**
- INSTALL EROSION CONTROL BARRIERS AS SHOWN AS FIRST ORDER OF WORK.
 - SEE GENERAL EROSION CONTROL NOTES ON "EROSION CONTROL NOTES & DETAILS SHEET".
 - PROVIDE INLET PROTECTION AROUND ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED.
 - INSTALL STABILIZED CONSTRUCTION ENTRANCES.
 - INSPECT INLET PROTECTION AND PERIMETER EROSION CONTROL MEASURES DAILY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
 - ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER AND MULCH.
 - CONSTRUCT EROSION CONTROL BLANKET ON ALL SLOPES STEEPER THAN 3:1.
 - PRIOR TO ANY WORK OR SOIL DISTURBANCE COMMENCING ON THE SUBJECT PROPERTY, INCLUDING MOVING OF EARTH, THE APPLICANT SHALL INSTALL ALL EROSION AND SILTATION MITIGATION AND CONTROL MEASURES AS REQUIRED BY STATE AND LOCAL PERMITS AND APPROVALS.
 - CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE CONSTRUCTION PERIOD. DUST CONTROL MEASURES SHALL INCLUDE, BUT ARE NOT LIMITED TO, SPRINKLING WATER ON UNSTABLE SOILS SUBJECT TO ARID CONDITIONS.
 - THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
 - ALL CATCH BASIN SUMPS AND PIPING SHALL BE THOROUGHLY CLEANED TO REMOVE ALL SEDIMENT AND DEBRIS AFTER THE PROJECT HAS BEEN FULLY PAVED.
 - TEMPORARY SOIL STOCKPILE SHALL BE SURROUNDED BY SILT FENCE AND SHALL BE STABILIZED BY TEMPORARY EROSION CONTROL SEEDING. STOCKPILE AREAS TO BE LOCATED AS FAR AS POSSIBLE FROM THE DELINEATED EDGE OF WETLANDS.
 - SAFETY FENCING SHALL BE PROVIDED AROUND STOCKPILES OVER 10 FT.
 - CONCRETE TRUCKS WILL BE REQUIRED TO WASH OUT (IF NECESSARY) SHOOTS ONLY WITHIN AREAS WHERE CONCRETE HAS BEEN PLACED. NO OTHER WASH OUT WILL BE ALLOWED.

- UTILITY NOTES:**
- COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
• NATURAL GAS - UNITIL
• WATER - CITY OF PORTSMOUTH DPW
• ELECTRIC - EVERSOURCE
• COMMUNICATIONS - FAIRPOINT
 - ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
 - THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE APPLICABLE UTILITY COMPANIES.
 - THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
 - CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES.
 - SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN
 - CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING WITH POWER COMPANY.

SPECIAL NOTE:
NO FIELD SURVEY HAS BEEN PERFORMED FOR THIS SITE. LOCATIONS AND ELEVATIONS OF ALL EXISTING SURFACE FEATURES ARE APPROXIMATE AND BASED ON A COMPILATION OF THE REFERENCE PLANS (SEE SHEET C-101). THE LOCATIONS AND ELEVATIONS OF SUBSURFACE SITE FEATURES ARE BASED ON REFERENCE PLAN #5 (SEE SHEET C-101). THE CONTRACTOR SHALL VERIFY LOCATIONS AND ELEVATIONS OF ALL SITE FEATURES PRIOR TO THE START OF CONSTRUCTION.



- LEGEND**
- APPROXIMATE LOCATION OF EXISTING BUILDING
 - APPROXIMATE LOCATION OF EXISTING VERTICAL GRANITE CURB
 - APPROXIMATE LOCATION OF EXISTING CATCH BASIN
 - APPROXIMATE LOCATION OF EXISTING DRAIN MANHOLE
 - APPROXIMATE LOCATION OF EXISTING WATER VALVE
 - PAINTED ADA PARKING SYMBOL
 - LIMIT OF PROPOSED BUILDING
 - PROPOSED VERTICAL GRANITE CURB
 - PROPOSED BUILDING OVERHANG
 - PROPOSED PAVEMENT SECTION
 - PROPOSED DRAIN MANHOLE
 - PROPOSED DRAIN LINE
 - PROPOSED INLET PROTECTION
 - PROPOSED SILT SOCK
 - PROPOSED DOOR
 - PROPOSED TIP DOWN RAMP WITH ADA WARNING PANEL
 - PROPOSED PAINTED ISLAND
 - PROPOSED FLOW DIRECTION/SLOPE
 - VERIFY IN FIELD COORDINATE BUILDING DRAWING
 - INVERT
 - VITRIFIED CLAY PIPE
 - HIGH DENSITY POLYETHYLENE

CITY OF PORTSMOUTH

**FACADE
REPLACEMENT &
ADDITION -
PORTSMOUTH CITY
HALL**

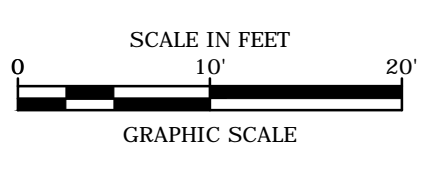
1 Junkins Avenue
Portsmouth, NH 03801

NO.	DESCRIPTION	DATE



FOR ADDITIONAL INFORMATION, REFER TO PROJECT MANUAL.

CONTENT:	
SITE PLAN	
DRAWN BY:	CML
PROJECT NO:	16-042-00
DATE:	02/17/2017
REVISED:	
SCALE:	1" = 10'
C1.02	
Project Phase	
CONSTRUCTION DOCUMENTS - PERMIT ONLY	
7/20/16 - 1/16/18 BY LAVALLEE-BRENSINGER PROFESSIONAL ASSOCIATION. ALL RIGHTS RESERVED. NO REPRODUCTION WITHOUT PERMISSION.	





Notes:

1. Test borings were performed on February 16, 2017 under the direction of JTC.
2. Test boring locations should be considered approximate.
3. Refer to the Test Boring Logs for the subsurface conditions encountered at each boring location.
4. Basemap source: 2017 Google Imagery.
5. Not to scale.

**City of Portsmouth
1 Junkins Avenue
Portsmouth, New Hampshire 03801**

**Portsmouth Police Station Addition
1 Junkins Avenue
Portsmouth, New Hampshire**



TEST BORING LOCATION PLAN

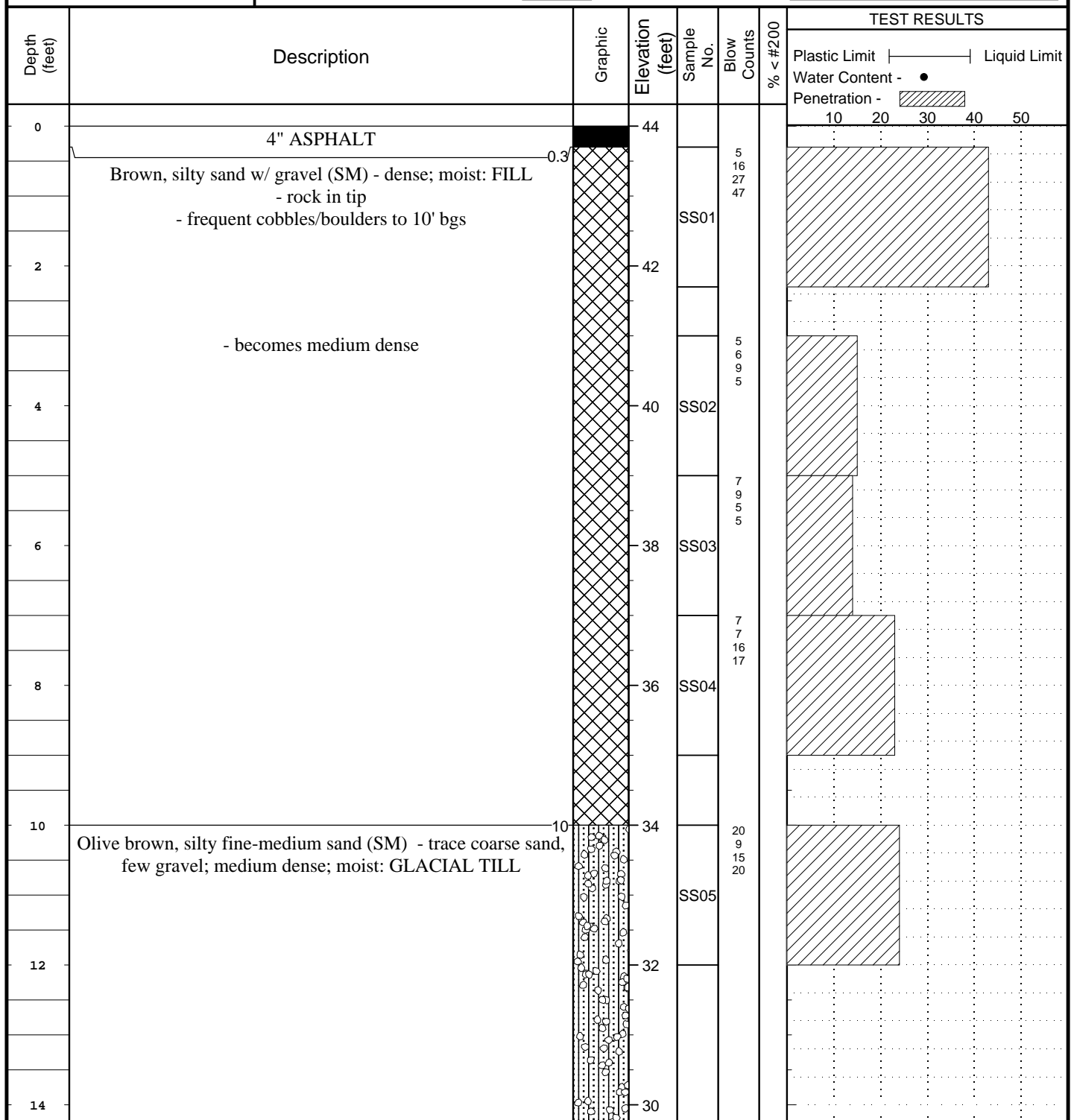
Test Boring Logs & Key to Symbols and Descriptions



PROJECT: Portsmouth Police Station Addition **PROJECT NO.:** 17-15-009
CLIENT: City of Portsmouth
PROJECT LOCATION: 1 Junkins Ave, Portsmouth, NH
LOCATION: See Boring Location Plan **ELEVATION:** 44
DRILLER: SoilEx **LOGGED BY:** RC
DRILLING METHOD: Hollow Stem Augers **DATE:** 2/16/17
DEPTH TO - WATER> INITIAL: ∞ **AFTER 24 HOURS:** ∞

**LOG OF BORING
No. B-1**

This information pertains only to this boring and should not be interpreted as being indicative of the site.



Soil borings were backfilled with cuttings and imported gravel (provided by City) upon completion.

Figure



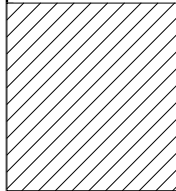
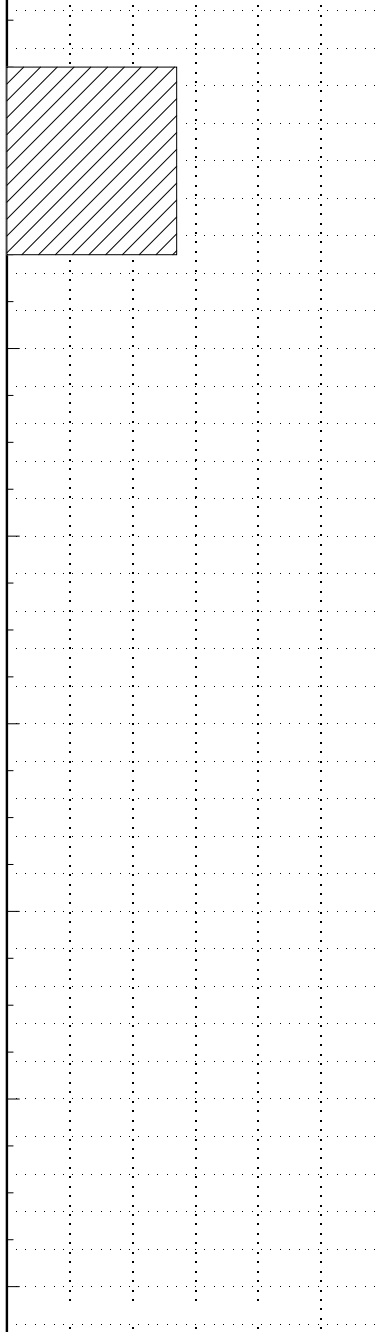
PROJECT: Portsmouth Police Station Addition **PROJECT NO.:** 17-15-009
CLIENT: City of Portsmouth
PROJECT LOCATION: 1 Junkins Ave, Portsmouth, NH
LOCATION: See Boring Location Plan **ELEVATION:** 44
DRILLER: SoilEx **LOGGED BY:** RC
DRILLING METHOD: Hollow Stem Augers **DATE:** 2/16/17
DEPTH TO - WATER> INITIAL: ∅ **AFTER 24 HOURS:** ∅

**LOG OF BORING
No. B-1**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS		
							Plastic Limit	Liquid Limit	
16	Auger refusal on probable bedrock at 19' bgs		28	SS06	41				
18			26		13				
20	Boring terminated at 19 ft.		24						
22			22						
24			20						
26			18						
28			16						

Plastic Limit ———— Liquid Limit
 Water Content - ●
 Penetration -



Soil borings were backfilled with cuttings and imported gravel (provided by City) upon completion.



PROJECT: Portsmouth Police Station Addition **PROJECT NO.:** 17-15-009
CLIENT: City of Portsmouth
PROJECT LOCATION: 1 Junkins Ave, Portsmouth, NH
LOCATION: See Boring Location Plan **ELEVATION:** 32
DRILLER: SoilEx **LOGGED BY:** RC
DRILLING METHOD: Hollow Stem Augers **DATE:** 2/16/17
DEPTH TO - WATER> INITIAL: ∅ **AFTER 24 HOURS:** ∅

**LOG OF BORING
No. B-2**

This information pertains only to this boring and should not be interpreted as being indicative of the site.

Depth (feet)	Description	Graphic	Elevation (feet)	Sample No.	Blow Counts	% < #200	TEST RESULTS	
							Plastic Limit	Liquid Limit
0	5" ASPHALT		32					
0.4	Brown, silty sand w/ gravel (SM) - very dense; moist: FILL - frequent cobbles/boulders to 5' bgs		30	SS01	40 34 20 17			
2	- becomes medium dense							
4								
5	Olive brown, silty fine-medium sand (SM) - trace coarse sand, few gravel; very dense; moist: GLACIAL TILL - 6" rock fragments in spoon		26	SS03	11 11 7 2			
6								
6.5	Weathered Bedrock							
8	Auger refusal on probable bedrock at 8.5' bgs		24					
	Boring terminated at 8.5 ft.							
10								
12								
14								

Plastic Limit ———— Liquid Limit
 Water Content - ●
 Penetration -

10 20 30 40 50

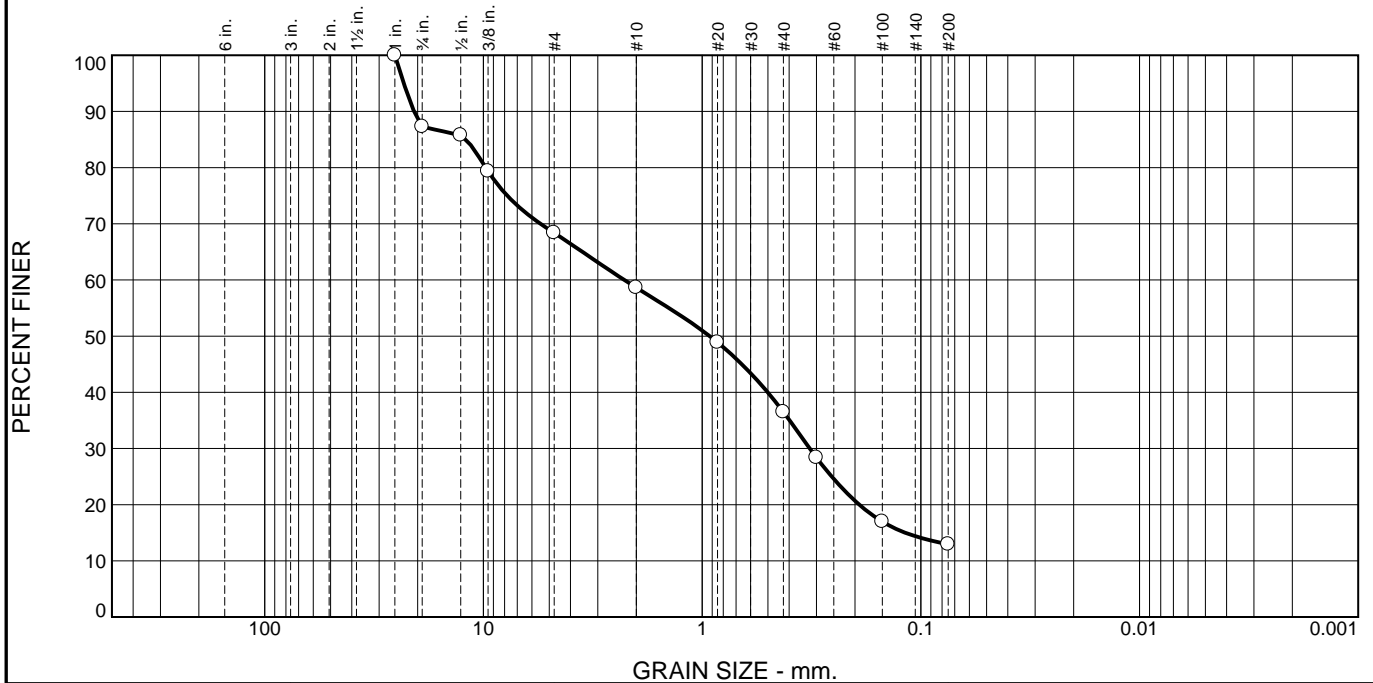
83

Soil borings were backfilled with cuttings and imported gravel (provided by City) upon completion.

MAJOR DIVISIONS			GROUP SYMBOLS	GENERAL DESCRIPTIONS	TYPICAL SYMBOLS																									
COARSE GRAINED SOILS (More than 50% RETAINED on No. 200 sieve)	GRAVELS (More than 50% of coarse fraction RETAINED on No. 4 sieve)	CLEAN GRAVELS (Less than 5% fines)	GW	Well graded gravels or gravel-sand mixtures; trace or no fines.		Shelby Tube				Auger Cuttings																				
		GP	Poorly graded gravels or gravel-sand mixtures; trace or no fines.		Standard Split Spoon Sample				3" Split Spoon Sample																					
		GRAVELS WITH FINES (More than 12% fines)	GM	Silty gravels or gravel-sand-silt mixtures.		Rock Core				Dynamic Cone Penetrometer																				
			GC	Clayey gravels or gravel-sand-clay mixtures.		Vane Shear				Bulk/Grab Sample																				
	SANDS (50% or more of coarse fraction PASSES the No. 4 sieve)	CLEAN SANDS (Less than 5% fines)	SW	Well graded sands or sand-gravel mixtures; trace or no fines.		Geoprobe Sample				Sonic or Vibro-Core Sample																				
		SP	Poorly graded sands or sand-gravel mixtures, trace or no fines.		Water Table at time of drilling				Water Table after 24 hours																					
		SANDS WITH FINES (More than 12% fines)	SM	Silty sands or sand-gravel-silt mixtures.	CORRELATION OF STANDARD PENETRATION TEST (SPT) WITH RELATIVE DENSITY AND CONSISTENCY																									
			SC	Clayey sands or sand-gravel-clay mixtures.																										
	FINE GRAINED SOILS (50% or more PASSES the No. 200 sieve)	SILTS AND CLAYS (Liquid Limit LESS than 50)	ML	Inorganic silts or rock flour. Non-plastic or very slightly plastic. PI < 4 or plots below "A" line.	GRAVEL, SAND, & SILT (NON-PLASTIC)		SILT (PLASTIC) & CLAY																							
			CL	Inorganic lean clay. Low to medium plasticity. PI > 7 and plots on or above "A" line.	N-Value	Relative Density	N-Value	Su (psf)	Consistency																					
OL			Organic silts, clays, and silty clays. Low to medium plasticity.	0 - 4	Very Loose	0 - 2	0 - 250	Very Soft																						
MH			Inorganic elastic silt. PI plots below "A" line.	4 - 10	Loose	2 - 4	250 - 500	Soft																						
				10 - 30	Medium Dense	4 - 8	500 - 1000	Medium Stiff																						
SILTS AND CLAYS (Liquid Limit of 50 or GREATER)		OH	Organic silts and clays. High plasticity.	30 - 50	Dense	8 - 15	1000 - 2000	Stiff																						
				Over 50	Very Dense	15 - 30	2000 - 4000	Very Stiff																						
				SPT Notes: WR = Weight of Rods; WH = Weight of Hammer																										
				TERMS DESCRIBING SOILS (excludes particles > 3", organics, debris, etc.)		TERMS DESCRIBING MATERIALS (i.e. particles > 3", organics, debris, etc.)																								
				Trace: Particles present, but < 5%		Occasional: Particles present, but < 10%																								
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils. Decomposed vegetable tissue. Fibrous to amorphous texture.	Few: 5% to 15%		Frequent: 10% to 25%																									
			Little: 15% to 25%		Many: > 25%																									
			Some: 25% to 50%																											
BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.				TERMS DESCRIBING MOISTURE		TERMS DESCRIBING STRUCTURE																								
				Dry: Absence of moisture; dusty		Layer: > 3" thick																								
				Moist: Damp, but no visible water		Seam: 1/16" to 3" thick																								
Wet: Visible/free water		Parting: < 1/16" thick																												
<table border="1" style="margin: auto;"> <tr> <th rowspan="2">SILT OR CLAY</th> <th colspan="3">SAND</th> <th colspan="2">GRAVEL</th> <th rowspan="2">Cobbles</th> <th rowspan="2">Boulders</th> </tr> <tr> <th>Fine</th> <th>Medium</th> <th>Coarse</th> <th>Fine</th> <th>Coarse</th> </tr> <tr> <td></td> <td>No.200</td> <td>No.40</td> <td>No.10</td> <td>No.4</td> <td>3/4"</td> <td>3"</td> <td>12"</td> </tr> </table> <p style="text-align: center;">U.S. STANDARD SIEVE SIZE</p>										SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders	Fine	Medium	Coarse	Fine	Coarse		No.200	No.40	No.10	No.4	3/4"	3"	12"
SILT OR CLAY	SAND			GRAVEL		Cobbles	Boulders																							
	Fine	Medium	Coarse	Fine	Coarse																									
	No.200	No.40	No.10	No.4	3/4"	3"	12"																							
<h2 style="margin: 0;">KEY TO SYMBOLS AND DESCRIPTIONS</h2>																														
References: ASTM D 2487 (Unified Soil Classification System) and ASTM D 2488 (Visual-Manual Procedure).																														

Geotechnical Laboratory Testing Reports

Particle Size Distribution Report



% Cobbles	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.7	18.9	9.8	22.1	23.6	12.9	

TEST RESULTS			
Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1	100.0		
3/4	87.3		
1/2	85.7		
3/8	79.4		
#4	68.4		
#10	58.6		
#20	48.9		
#40	36.5		
#50	28.4		
#100	17.0		
#200	12.9		

* (no specification provided)

Material Description

Silty sand with gravel

Atterberg Limits (ASTM D 4318)

PL= _____ LL= _____ PI= _____

Classification

USCS (D 2487)= SM AASHTO (M 145)= _____

Coefficients

D₉₀= 20.7552 D₈₅= 12.0191 D₆₀= 2.2679
D₅₀= 0.9242 D₃₀= 0.3221 D₁₅= 0.1178
D₁₀= _____ C_u= _____ C_c= _____

Remarks

In-Situ Moisture: 12.6%

Date Received: 2-16-17 Date Tested: 2-21-17
Tested By: Ted Moody
Checked By: Travis Carpenter
Title: VP of Geotech Engineering

Location: B-1(S-1) Sample Number: 17-094 Depth: 0'-2'

Date Sampled: 2-16-17



Client: City of Portsmouth
Project: Portsmouth City Hall - Portsmouth, NH

Project No: 17-15-009

Figure 001

Site Photographs

SITE PHOTOGRAPHS

PORTSMOUTH POLICE STATION ADDITION 1 JUNKINS AVENUE PORTSMOUTH, NEW HAMPSHIRE



Site, To Northeast (set up at B-1)



Site, To Northwest (set up at B-2)



Drilling operations, Typical



Sample of Fill with broken rock pieces



Sample of Glacial Till



Sample of pieces of broken ledge