PROJECT MANUAL FOR CONSTRUCTION OF

THE VILLAGE @ West Jefferson

Louisville, Kentucky





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THE VILLAGE @ West Jefferson

Louisville, Kentucky

KOVERT HAWKINS ARCHITECTS, INC.

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SECTION 00100 - NOTICE TO BIDDERS

Notice is hereby given that sealed proposals will be received:

- BY: Molo Village CDC Co 5609 Billtown Road Louisville, KY 40299
- FOR: The Village @ West Jefferson 1225 West Jefferson Street Louisville, KY
- AT: Kovert Hawkins Architects, Inc. 630 Walnut Street Jeffersonville, IN 47130
- DATE: January 12, 2018
- TIME: 2:00 P.M. (Local Time)

The Owner will open all bids privately at the convenience of the Owner.

Proposals received after the hour and date set for receiving of proposals, will be returned unopened.

All work will be awarded under a single General Contract.

Proposals shall be executed on the Proposal Form included in the bid documents. The signed and sealed hard copy bid documents are on file with the Owner and Architect and may be examined by Bidders at the following locations:

Molo Village CDC Co.	Kovert Hawkins Architects, Inc.
5609 Billtown Road	630 Walnut Street
Louisville, KY 40299	Jeffersonville, IN 47130
	812-282-9554 p

Bidding is BY INVITATION ONLY.

All bidders will have free access to a complete electronic set of Drawings and Specifications. All bid documents may be downloaded free of charge in electronic PDF format for viewing, printing and distribution to bidders, sub-bidders, suppliers, and reprographics services at the discretion and responsibility of the General Contractors. Bidders shall complete the Plan Holder List form via <u>www.koverthawkins.com/bid-information</u>. Upon completion of the form, bidders will be re-directed to the Project Page where all bid information may be downloaded. Bidders should bookmark this link and <u>www.koverthawkins.com/bid-information</u> for future access. A list of updated Plan Holders and Addenda will periodically be posted and made available for download.

The Architect retains all copyright to the bid documents, as instruments of their professional service. Bidders, or any other persons, may not use the PDF files for any other purpose than preparing a bid for this project. Bidders may not distribute bid documents or files to Plan Rooms (either electronic or hard copy format) without the express written permission of the Architect.

For convenience of the bidders, complete electronic files will also be sent to the following reprographic services. Bidders are responsible for costs of any desired printing of drawings and/or specifications directly from these reprographics services at cost of printing plus any shipping and handling charges. Don Meredith Company

2434a Crittenden Drive Louisville, KY 40217 502-636-0155 p

All questions and requests for substitutions shall be directed to: **Hal E. Kovert, AIA** Kovert Hawkins Architects, Inc. hal.kovert@koverthawkins.com

Bid Security in the amount of five percent (5%) of the Proposal, including all add alternates must accompany each Proposal in accordance with the Instructions to Bidders.

The Owner reserves the right to accept or reject any bid and to waive any irregularities in bidding. The Base Bid may be held for a period not to exceed Forty-Five (45) days before awarding Contracts. All additive Alternate Bids may be held for a period not to exceed Thirty (30) days after signing of Contract.

Should a successful Bidder withdraw his bid, or fail to execute a satisfactory contract within ten (10) days after notice of acceptance of his bid, the Owner may declare the Bid Security forfeited as liquidated damages, not as penalty.

The successful Bidder shall furnish a Performance Bond and Labor and Materials Payment Bond in an amount equal to one hundred percent (100%) of the Contract Sum with an approved surety company and said bond shall remain in full force and effect for a period of one (1) year after date of final acceptance of the work. The cost of all bonds shall be included in the bid price.

MAIA® Document A701[™] – 1997

Instructions to Bidders

for the following PROJECT:

(Name and location or address) The Village @ West Jefferson 1225 West Jefferson Street Louisville, Kentucky

THE OWNER:

(Name, legal status and address) Molo Village CDC Co. 5609 Billtown Road Louisville, KY 40299

THE ARCHITECT:

(Name, legal status and address) Kovert Hawkins Architects, Inc. 630 Walnut Street Jeffersonville IN 47130

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ADDITIONS AND DELETIONS:

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

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement or Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders, the bid form, and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

§ 1.2 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.

§ 1.3 Addenda are written or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The 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 from which Work may be deleted for sums stated in Alternate Bids.

§ 1.6 An 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 the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 The Bidder by making a Bid represents that:

§ 2.1.1 The Bidder has read and understands the Bidding Documents or Contract Documents, to the extent that such documentation relates to the Work for which the Bid is submitted, and for other portions of the Project, if any, being bid concurrently or presently under construction.

§ 2.1.2 The Bid is made in compliance with the Bidding Documents.

§ 2.1.3 The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents.

§ 2.1.4 The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 COPIES

§ 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the issuing office designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein. The deposit will be refunded to Bidders who submit a bona fide Bid and return the Bidding Documents in good condition within ten days after receipt of Bids. The cost of replacement of missing or damaged documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the Bidding Documents and the Bidder's deposit will be refunded.

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§ 3.1.2 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the Advertisement or Invitation to Bid, or in supplementary instructions to bidders.

§ 3.1.3 Bidders shall use complete sets of Bidding Documents in preparing Bids; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

§ 3.1.4 The Owner and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

§ 3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

§ 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

§ 3.2.2 Bidders and Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Bids.

§ 3.2.3 Interpretations, corrections and changes of the Bidding Documents will be made by Addendum. Interpretations, corrections and changes of the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely upon them.

§ 3.3 SUBSTITUTIONS

§ 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

§ 3.3.2 No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including drawings, performance and test data, and other information necessary for an evaluation. A statement setting forth changes in other materials, equipment or other portions of the Work, including changes in the work of other contracts that incorporation of the proposed substitution would require, shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.3 If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals made in any other manner.

§ 3.3.4 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 ADDENDA

§ 3.4.1 Addenda will be transmitted to all who are known by the issuing office to have received a complete set of Bidding Documents.

§ 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.

§ 3.4.3 Addenda will be issued no later than four days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Each Bidder shall ascertain prior to submitting a Bid that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

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ARTICLE 4 BIDDING PROCEDURES § 4.1 PREPARATION OF BIDS

§ 4.1.1 Bids shall be submitted on the forms included with the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.

§ 4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change."

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall make no additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name of the Bidder and the nature of legal form of the Bidder. The Bidder shall provide evidence of legal authority to perform within the jurisdiction of the Work. Each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder.

§ 4.2 BID SECURITY

§ 4.2.1 Each Bid shall be accompanied by a bid security in the form and amount required if so stipulated in the Instructions to Bidders. The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and will, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the bid security shall not be forfeited to the Owner in the event the Owner fails to comply with Section 6.2.

§ 4.2.2 If a surety bond is required, it shall be written on AIA Document A310, Bid Bond, unless otherwise provided in the Bidding Documents, and the attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of the power of attorney.

§ 4.2.3 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until either (a) the Contract has been executed and bonds, if required, have been furnished, or (b) the specified time has elapsed so that Bids may be withdrawn or (c) all Bids have been rejected.

§ 4.3 SUBMISSION OF BIDS

§ 4.3.1 All copies of the Bid, the bid security, if any, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.2 Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date for receipt of Bids will be returned unopened.

§ 4.3.3 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.4 Oral, telephonic, telegraphic, facsimile or other electronically transmitted bids will not be considered.

§ 4.4 MODIFICATION OR WITHDRAWAL OF BID

§ 4.4.1 A Bid may not be modified, withdrawn or canceled by the Bidder during the stipulated time period following the time and date designated for the receipt of Bids, and each Bidder so agrees in submitting a Bid.

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§ 4.4.2 Prior to the time and date designated for receipt of Bids, a Bid submitted may be modified or withdrawn by notice to the party receiving Bids at the place designated for receipt of Bids. Such notice shall be in writing over the signature of the Bidder. Written confirmation over the signature of the Bidder shall be received, and date- and time-stamped by the receiving party on or before the date and time set for receipt of Bids. A change shall be so worded as not to reveal the amount of the original Bid.

§ 4.4.3 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

§ 4.4.4 Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

ARTICLE 5 CONSIDERATION OF BIDS § 5.1 OPENING OF BIDS

At the discretion of the Owner, if stipulated in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids may be made available to Bidders.

§ 5.2 REJECTION OF BIDS

The Owner shall have the right to reject any or all Bids. A Bid not accompanied by a required bid security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

§ 5.3 ACCEPTANCE OF BID (AWARD)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's own best interests.

§ 5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION § 6.1 CONTRACTOR'S QUALIFICATION STATEMENT

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted as a prerequisite to the issuance of Bidding Documents.

§ 6.2 OWNER'S FINANCIAL CAPABILITY

The Owner shall, at the request of the Bidder to whom award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Bids, furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 SUBMITTALS

§ 6.3.1 The Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the manufacturers, products, and the suppliers of principal items or systems of materials and equipment proposed for the Work; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

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§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, (1) withdraw the Bid or (2) submit an acceptable substitute person or entity with an adjustment in the Base Bid or Alternate Bid to cover the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND § 7.1 BOND REQUIREMENTS

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Bonds may be secured through the Bidder's usual sources.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 If the Owner requires that bonds be secured from other than the Bidder's usual sources, changes in cost will be adjusted as provided in the Contract Documents.

§ 7.2 TIME OF DELIVERY AND FORM OF BONDS

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to be commenced prior thereto in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond. Both bonds shall be written in the amount of the Contract Sum.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder 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 the power of attorney.

ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

SECTION 00211 - SUPPLEMENTARY INSTRUCTIONS TO BIDDERS (Non-Public Works)

The following supplements modify the Instructions to Bidders, AIA Document A701 - 1997, entitled "Instructions to Bidders". Where a portion of the Instruction to Bidders is modified or deleted by these Supplementary Instructions, the unaltered portions of the Instructions To Bidders shall remain in effect.

ARTICLE 9 - SUPPLEMENTARY INSTRUCTIONS

- 9.1 Article 3 BIDDING DOCUMENTS, delete the current Paragraph and replace with the following:
 - 3.1.1 All bid documents may be downloaded free of charge in PDF format for viewing, printing and distribution to bidders, sub-bidders and suppliers at the discretion and responsibility of the general contractors. All information is posted on a website identified in the Notice To Bidders or available by contacting the Architect. The Architect retains all copyright to all Bid Documents. Bidders may not use the Bid Documents for any purpose except preparing a bid for this project. Bidders may not distribute Bid Documents to Plan Room services, either electronic or hard copy, without the express written permission of the Architect.Printing of bid documents, including all costs associated therewith, is to be borne by the bidders.
- 9.2 Article 3 BIDDING DOCUMENTS, delete the current Paragraph and replace with the following:
 - 3.1.2 Bid documents are available to sub-bidders in accordance with Paragraph 3.1.1.
- 9.3 Article 3 BIDDING DOCUMENTS, add the following Paragraph:
 - 3.1.5 In the event of any discrepancy between electronic versions and any hard copy, printed versions of the files, the hard copy version on file at the Architect's office will govern.
- 9.4 Article 3 BIDDING DOCUMENTS, add the following Paragraph:
 - 3.3.5 When specifications include a list of acceptable manufacturers, it is done for the express purpose of establishing a basis of durability, efficiency, configuration, maintain Owner's maintenance stock, and not for the purpose of limiting competition. These said names establish the products on which the bidder's proposal shall be based for that particular specification item. Proposed substitutions must be submitted in accordance with Specification Section 01630-Product Options and Substitutions.
- 9.5 Article 3 BIDDING DOCUMENTS, delete the current Paragraph and replace with the following:
 3.4.1 Addenda will be added to the bid documents and made available to all bidders via the website.
- 9.6 Article 3 BIDDING DOCUMENTS, delete Paragraph 3.4.3.
- 9.7 Article 4 BIDDING PROCEDURES, delete Paragraph 4.2 in its entirety, including 4.2.1, 4.2.2 and 4.2.3.
- 9.8 Article 5 CONSIDERATION OF BIDS, delete the current Paragraph and replace with the following:
 5.1 Bids received will be privately opened at the convenience of the Owner.
- 9.9 Article 5 CONSIDERATION OF BIDS, delete the current Paragraph and replace with the following:
 - 5.3.1 The Owner shall have the right to accept or reject any and/or all Bids, determined upon any basis. The Owner shall have the right to waive informalities and irregularities in a Bid received and to accept or reject a Bid which, in the Owner's judgment, is in the Owner's best interest. All are at the sole discretion of the Owner.
- 9.10 Article 7 PERFORMANCE BOND AND PAYMENT BOND. Under Section 7.1.1, delete the words "If stipulated in the Bidding Documents, the" and substitute the word "The".
 - Under Section 7.1.1, add the following sentence: "The costs for all Bonds must be included in the bid price."

Delete Section 7.1.2 in its entirety.

- 9.11 Electronic submissions of bids are NOT acceptable. This includes fax and e-mail. Bidder shall submit two (2) copies of all required Bidding Documents.
- 9.12 A Wage Scale of minimum wage rates is not required nor has one been established for this project.
- 9.13 Materials supplied for this project shall be exempt from State Sales Tax.
 - 1. Upon award of the bid the General Contractor will assist the Owner in establishing separate accounts with all material suppliers.
 - 2. All materials shall be purchased in the non-profits name.
 - 3. All materials shall be paid for with the non-profits checks or money orders.
 - 4. Building material suppliers shall not charge Sales Tax.
 - 5. This procedure shall be conducted in accordance with Kentucky State Law.

SECTION 00220 – CONTRACTOR'S BID SUBMITTAL CHECKLIST

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Submittals required at time of bid.
 - 2. Submittals required following bid.
- 1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 00100 - Notice to Bidders

AIA A701 - Instructions to Bidders

Section 00210 - Supplementary Instructions to Bidders

Section 00410 - Bid Security Form

Section 00430 - Subcontractor List

Section 00600 - Contractor's Bond for Construction

Section 00670 - Escrow Agreement

Section 01370 - Schedule of Values

Proposal Form

1.03 BID SUBMITTALS

- A. The following items are to be submitted by all bidders for all contracts at the time of bidding:
 1. Proposal Form
- B. Submit **two** copies (one signed original and one copy) of above information.

1.04 POST-BID SUBMITTALS

- A. The following items are to be submitted by each successful bidder for all contracts within Twenty-Four (24) hours following the time of bidding:
 - 1. Schedule of Values
 - 2. Subcontractor List

B. The following items are to be submitted prior to execution of the Owner-Contractor Agreement:

- 1. Performance Bond
- 2. Labor & Material Payment Bond
- 3. Certificate of Insurance
- 4. Signed Escrow Agreement
- C. Submit all above items to Architect for review and approval.

SECTION 00300 - CONTRACTOR'S BID FORM

1.01 PROJECT MANUAL

A. All requirements of the Project Manual shall apply to this Section.

1.02 <u>SCOPE</u>

- A. Contractor's Bid Form shall be Proposal Form, as included in Section 00303.
 - 1. Entire form must be completed.
 - 2. Proposal Form shall be submitted in duplicate (one signed original and one copy).
 - 3. Forms to be reproductions of those included in Project Manual.
 - 4. Contractor may bid each, any, or all separate contracts listed.
- B. The executed Proposal Form will become a part of the successful Bidder's Contract Documents.

THE VILLAGE @ WEST JEFFERSON Louisville, Kentucky

PROPOSAL FORM

CONTRACTOR'S BID FOR:	The Village @ West Jefferson
	1225 West Jefferson Street, Louisville, KY

Owner:	Molo Village CDC, Inc.
Date:	
Bidder (Firm):	
Address:	
City, State, Zip:	
Telephone No.:	
Fax No.:	
E-Mail Address:	

Pursuant to notices given, the undersigned proposes to furnish all material and labor necessary to complete general construction according to plans and specifications prepared by KOVERT HAWKINS ARCHITECTS, 630 Walnut Street, Jeffersonville, Indiana, for the sum of:

BASE BID

	¢
Lump Sum	D
	T

ADDENDA

Acknowledges receipt of:

Addendum No	Dated	No. of Pages
Addendum No	Dated	No. of Pages
Addendum No	Dated	No. of Pages
Addendum No	Dated	No. of Pages

ALTERNATES

The undersigned also proposes to furnish or to omit all labor and materials necessary to complete work as required by the Alternate Bids, as provided in the specifications as follows:

Alternate No. 1:	Tenant Build-Out	Add	\$
Alternate No. 2:	West Parking Lot	Add	\$

PROPOSAL FORM

	_AGE @ WES ⁻ , Kentucky	I JEFFERSON						1583.01 0/02/17
Alternate	No. 3:	Demolition of Existir	g Building	Add	\$			
Alternate	No. 4:	Kynar Finish		Add	\$			
Alternate	No. 5:	Project Security		Add	\$			
Alternate	No. 6:	Synthetic Stone		Add/Deduct	\$			
<u>ALLOWA</u> By initialir		amounts below, bidd	er acknowledges a	llowance amoun	ts are	included in	the forgoing	bid:
Cash	Allowances v	vithin the Base Bid p	er Section 01210:	Awnings	\$60),000	initials	
				Brick	\$	800 /1000	initials	
Conti	ngency Allow	ance within the Base	Bid per Section C	1220	\$ 10	00,000	initials	
Undersign GENERA I hereby c and Adde Dated at	L CONTRACT certify that we lenda, and have	s, if awarded contrac OR CERTIFICATION have obtained a com reviewed the jobsite	l blete set of constru to sufficiently fami	ction documents liarize ourselves	(s, inclu with t) calendar Iding all Dra he existing	r days. Iwings, Spec	
BY								
	(Title of Perso	n Signing)		-				
<u>OATH AN</u>	ND AFFIRMAT	ION						
I hereby a correct.	affirm under the	e penalties for perjury	r that the facts and	information cont	tained	in the foreg	joing bid is tr	ue and
Dated at _		this	day of	,	20	·		
	(Name of Orga	anization)						
BY								
	(Title of Perso	n Signing)		-				

ACKNOWLEDGEMENT			
STATE OF			
COUNTY OF			
Before me, a Notary Public, personally appeared th	ne above-named _		and
swore that the statements contained in the foregoir	ng document are tr	(Name of Person Signing) rue and correct.	
Subscribed and sworn to before me this	day of	, 20	
		Notary Public	
My Commission Expires:			
County of Residence:			
END OF SECTION 00303			

SECTION 00410 - BID SECURITY FORM

1.01 PROJECT MANUAL

All requirements of the Project Manual shall apply to this Section.

1.02 <u>SCOPE</u>

- A. Contractors Bid Security shall be either:
 - 1. Bid Bond.
 - 2. Certified Check.
 - 3. Cashier's Check.
- B. The Bid Bond, if used, shall be AIA Document A310 2010, entitled "Bid Bond".
 - 1. Bond shall be by an acceptable Surety Company licensed to do business in the State of Kentucky.
 - 2. A copy of this form is bound herewith.
- C. Bid Security shall be:
 - 1. In an amount equal to five (5) percent of the total lump sum base bid plus (5) percent of all add alternates.
 - 2. Security shall be executed in favor of the Owner.
 - Should the successful Bidder fail to enter into a contract or furnish the required Bonds within ten (10) days from date of notice of award, the Owner may declare the Bidder's Bid Security forfeited and the Security amount retained by the Owner as liquidated damages.
- D. Refer to Section 00220 Contractor's Bid Submittal Checklist for requirements as to time of submission.

MAIA® Document A310[™] – 2010

Bid Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal place of business)

OWNER:

(Name, legal status and address) Molo Village CDC Co. 5609 Billtown Road Louisville, KY 40299

BOND AMOUNT: \$

PROJECT:

(Name, location or address, and Project number, if any) The Village @ West Jefferson 1225 West Jefferson Street Louisville, Kentucky

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so

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.

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

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furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of ,

	(Contractor as Principal)	(Seal)
(Witness)	(Title)	
	(Surety)	(Seal)
(Witness)	(Title)	

1

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SECTION 00430 - SUBCONTRACTOR LIST

1.01 PROJECT MANUAL

All requirements of the Project Manual shall apply to this Section.

1.02 SCOPE

- A. Successful Bidder shall submit within 48 hours of bid date and time, his complete Subcontractors List for all trades and divisions of work.
- B. After submission of this List and after approval by the Architect/Engineer and Owner, it shall not be changed without written approval by the Owner and Architect/Engineer.
- C. Refer to Section 00220 Contractor's Bid Submittal Checklist for requirements as to time of submission.

1.03 <u>FORM</u>

Provide in Contractor's own format to include the following information:

- A. Description of work or trade.
- B. Company Name.
- C. Company Address.
- D. Company Phone and Fax.
- E. Contact Person.
- F. E-mail Address.

SECTION 00500 - AGREEMENT FORM

1.01 PROJECT MANUAL

All requirements of the Project Manual shall apply to this Section.

- 1.02 <u>SCOPE</u>
 - A. The agreement shall be AIA Document A101 2007, entitled "Standard Form of Agreement Between Owner and Contractor".
 - 1. Where the basis of payment is a stipulated sum.
 - 2. Copy of this form is bound herewith.
 - B. This form, when fully executed, becomes a part of the successful Bidder's Contract Documents.

Margin 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 day of in the year (In words, indicate day, month and year.)

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

Molo Village CDC Co. 5609 Billtown Road Louisville, KY 40299

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

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

The Village @ West Jefferson 1225 West Jefferson Street Louisville, Kentucky

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

Kovert Hawkins Architects, Inc. 630 Walnut Street Jeffersonville IN 47130 Telephone Number: 812.282.9554

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.

1

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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
- MISCELLANEOUS PROVISIONS 8
- 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.)

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 () 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.)

Init. 1

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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.)

ARTICLE 4 CONTRACT SUM

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

§ 4.2 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.)

§ 4.3 Unit prices, if any:

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

Item

Units and Limitations

Price Per Unit (\$0.00)

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

Item

Price

ARTICLE 5 PAYMENTS § 5.1 PROGRESS PAYMENTS

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

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

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the day of the month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than () days after the Architect receives the Application for Payment. (Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported

Init. 1

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by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the 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:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of percent (%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201TM–2007, General Conditions of the Contract for Construction;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of percent (%);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201-2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and (Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety. if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

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

§ 5.2 FINAL PAYMENT

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

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements,
 - if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

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

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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.)

§ 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.)

- Arbitration pursuant to Section 15.4 of AIA Document A201–2007
- [] Litigation in a court of competent jurisdiction
- [] Other (Specify)

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.

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

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

%

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

Rev. Dr. Jamesetta Ferguson

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

Init. 1

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

§ 8.6 Other provisions:

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.

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

§ 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.)

Section	Title	Date		Pages
§ 9.1.5 The Drawings: <i>(Either list the Drawings here</i>)	or refer to an exhibit	t attached to this A	greement.)	
Number		Title	Date	
§ 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.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- .1 AIA Document E201[™]–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:
- AIA Document A101™ 2007. Copyright © 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, 1987, 1991, 1997 and 2007 by The American Institute of Architects. All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 13:14:59 on 10/20/2017 under Order No. 3051976157 which expires on 06/26/2018, and is not for resale. User Notes:

.2 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

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.)

Type of insurance or bond

Limit of liability or bond amount (\$0.00)

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

OWNER (Signature)

CONTRACTOR (Signature)

Rev. Dr. Jamesetta Ferguson, President (Printed name and title)

(Printed name and title)

SECTION 00600 - CONTRACTOR'S BOND FOR CONSTRUCTION

1.01 PROJECT MANUAL

All requirements of the Project Manual shall apply to this Section.

- 1.02 <u>SCOPE</u>
 - A. The Performance Bond and Labor and Material Payment Bond shall be AIA Document A312 2010, comprised of two sections entitled "Performance Bond" and "Payment Bond".
 - 1. Bonds shall be executed by an acceptable Surety Company licensed to do business in the State of **Kentucky**.
 - 2. A copy of this form is bound herewith.
 - B. Bonds shall be executed in an amount equal to one hundred percent (100%) of the contract amount in favor of the Owner conditioned on the full and faithful performance of the contract and full payment of all obligations arising there under.
 - C. This form when fully executed becomes a part of the successful bidder's Contract Documents.



Performance Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal *place of business)*

OWNER:

(Name, legal status and address) Molo Village CDC Co. 5609 Billtown Road Louisville, KY 40299

CONSTRUCTION CONTRACT

Date: Amount: \$ Description: (Name and location) The Village @ West Jefferson 1225 West Jefferson Street Louisville, Kentucky

BOND

Date: (Not earlier than Construction Contract Date)

Amount: \$ Modifications to this Bond:

None

See Section 16

CONTRACTOR AS PRINCIPAL (Corporate Seal)

Company: Signature: SURETY Company: Signature:

(Corporate Seal)

Name and Name and Title: Title: (Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone) AGENT or BROKER: **OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:) Rev. Dr. Jamesetta Ferguson Molo Village CDC, Co. 5609 Billtown Road Louisville, KY 40299

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.

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

Init. 1

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 14 Definitions

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

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

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

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

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

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

§ 16 Modifications to this bond are as follows:

CONTRACTOR AS PRINCIPA	AL (Corporate Seal)	SURETY	(Corporate Seal)
Company: Signature:	(Corporate seat)	Company: Signature:	(Corporate seat)
Name and Title: Address:		Name and Title: Address:	

Init.

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Payment Bond

CONTRACTOR:

(Name, legal status and address)

SURETY:

(Name, legal status and principal *place of business)*

OWNER:

(Name, legal status and address) Molo Village CDC Co. 5609 Billtown Road Louisville, KY 40299

CONSTRUCTION CONTRACT

Date: Amount: \$ Description: (Name and location) The Village @ West Jefferson 1225 West Jefferson Street Louisville, Kentucky

BOND

Date: (Not earlier than Construction Contract Date)

Amount: \$ Modifications to this Bond:

None

See Section 18

CONTRACTOR AS PRINCIPAL

Company: Signature:

SURETY Company: Signature:

(Corporate Seal)

Name and Name and Title: Title: (Any additional signatures appear on the last page of this Payment Bond.)

(Corporate Seal)

(FOR INFORMATION ONLY — Name, address and telephone) AGENT or BROKER: **OWNER'S REPRESENTATIVE:**

(Architect, Engineer or other party:) Rev. Dr. Jamesetta Ferguson Molo Village CDC., Co 5609 Billtown Road Louisville, KY 40299

ADDITIONS AND DELETIONS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

§ 16 Definitions

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

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

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

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

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

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

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

§ 18 Modifications to this bond are as follows:

(Space is provided below for addition CONTRACTOR AS PRINCIPAL	tional signatures of ad	ded parties, other than those appearing on the cover page.) SURETY		
Company: Signature:	(Corporate Seal)	Company: Signature:	(Corporate Seal)	
Name and Title: Address:		Name and Title: Address:		

1

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SECTION 00670 - ESCROW AGREEMENT

1.01 PROJECT MANUAL

All requirements of the Project Manual shall apply to this Section.

1.02 SCOPE

- A. All funds retained by the Owner from approved certificates for payment shall be placed in Escrow per **Kentucky** Statutes.
 - 1. Escrow Agreement Form shall be provided by the Escrow Agent and shall be acceptable to both the Owner and the Contractor.
 - 2. Escrow Agreement, when executed shall become a part of the Contract Documents.
 - 3. All escrowed funds shall be deposited in a financial institute as agreed upon by both parties to the Contract.

END OF SECTION 00670

SECTION 00700 - GENERAL CONDITIONS

1.01 PROJECT MANUAL

All requirements of the Project Manual shall apply to this Section.

1.02 SCOPE

- A. The General Conditions shall be AIA Document A201 2007, entitled "General Conditions of the Contract for Construction".
 - 1. A copy of which is bound herewith.

END OF SECTION 00700

${\ensuremath{\underline{}}}{\ensuremath{\underline{}}{}} AIA^{\mbox{\tiny ``}}$ Document A201^{\\"} – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address) The Village @ West Jefferson 1225 West Jefferson Street Louisville, Kentucky

THE OWNER:

(Name, legal status and address) Molo Village CDC Co. 5609 Billtown Road Louisville, KY 40299

THE ARCHITECT:

(Name, legal status and address) Kovert Hawkins Architects, Inc. 630 Walnut Street Jeffersonville IN 47130

TABLE OF ARTICLES

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- **3 CONTRACTOR**
- **4 ARCHITECT**
- **5 SUBCONTRACTORS**
- 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
- 7 CHANGES IN THE WORK
- 8 TIME
- 9 PAYMENTS AND COMPLETION
- 10 PROTECTION OF PERSONS AND PROPERTY
- 11 INSURANCE AND BONDS
- 12 UNCOVERING AND CORRECTION OF WORK
- 13 MISCELLANEOUS PROVISIONS
- 14 TERMINATION OR SUSPENSION OF THE CONTRACT
- 15 CLAIMS AND DISPUTES

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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 INSTRUMENTS OF SERVICE

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

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 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.

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

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

§ 1.3 CAPITALIZATION

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

§ 1.4 INTERPRETATION

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

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. 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 Instruments of Service 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 Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service 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.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service 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 Agreement 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 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

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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 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. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. 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.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

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

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner 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

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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.

§ 3.5 WARRANTY

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.

§ 3.6 TAXES

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

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

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

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

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

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 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

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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, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information 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.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The 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.

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§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and 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.

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

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

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

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

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

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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 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.

§ 3.13 USE OF SITE

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.

§ 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 CLEANING UP

§ 3.15.1 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.

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

§ 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.

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§ 3.18 INDEMNIFICATION

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

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

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.

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§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

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

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

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The 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.

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§ 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 Subsubcontractor.

§ 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 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.

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

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

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

§ 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

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be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

- assignment is effective only after termination of the Contract by the Owner for cause pursuant to .1 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

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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 Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, 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.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
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.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 Change 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 Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, 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. 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 Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

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

§ 7.4 MINOR CHANGES IN THE WORK

The Architect 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.

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ARTICLE 8 TIME § 8.1 DEFINITIONS

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

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

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

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

§ 8.2 PROGRESS AND COMPLETION

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

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, 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. 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.

§ 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, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; 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.

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, 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 may require. This schedule, unless objected to by the Architect, 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.

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§ 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.

§ 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.

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

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

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

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

§ 9.7 FAILURE OF PAYMENT

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

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appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

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

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

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

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

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 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, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

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

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

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect

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will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) 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, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data 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 designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

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

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

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

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY § 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Subsubcontractors; 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.
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§ 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.

§ 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 bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

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

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§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, 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 the party seeking indemnity.

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

§ 10.4 EMERGENCIES

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S 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;
- Claims for damages because of bodily injury, sickness or disease, or death of any person other than the .3 Contractor's employees;
- Claims for damages insured by usual personal injury liability coverage; .4
- .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

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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.

§ 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 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Subsubcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. 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.

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

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 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

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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, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 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 during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, subsubcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, subsubcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the

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Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 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, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, 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.

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§ 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.

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

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

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, 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 the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

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

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

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 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.

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§ 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 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.

§ 13.6 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 or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 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 requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

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;
- Init.

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- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 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.

§ 14.1.3 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.

§ 14.1.4 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 if the Contractor

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

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

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

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

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

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

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§ 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 for the Owner's convenience and without cause.

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

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

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

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 either party 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.

§ 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 and the Owner shall continue to make payments 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 for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

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§ 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, 10.4, 11.3.9, and 11.3.10, 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 Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim 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.

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§ 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 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 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.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an

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additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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

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...

Kovert Hawkins Architects, Inc. 630 Walnut Street Jeffersonville IN 47130

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SECTION 00811 - SUPPLEMENTARY GENERAL CONDITIONS (Non-Public Works)

Unless otherwise provided in these Supplemental Conditions, all work shall be governed by the terms of AIA Document A201 - 2007, entitled "General Conditions of the Contract for Construction". The following Supplemental Conditions, modify, delete from and add to AIA A201. Where an Article Paragraph, Subparagraph or Clause of AIA A201 is modified, deleted from or added to by these Supplemental Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph or Clause shall remain in full force and effect. To the extent that there is any conflict or ambiguity between AIA A201 and these Supplemental Conditions, then these Supplemental Conditions shall control.

ARTICLE 1 - GENERAL PROVISIONS

1.1.1 THE CONTRACT DOCUMENTS

Add the following:

1. Proposal Form.

1.1.5 THE DRAWINGS

Add the following Paragraphs:

- 1.1.5.1 The Drawings are a graphic representation intended to convey the design intent of the Project. They are a 2-dimensional representation of a 3-dimensional Project, and they do not provide a detail for every construction condition of the project. The Drawings are a small scale representation of complex construction assemblies and components, and not every element of the Project can be indicated in these small scale representations. The Drawings are not an instruction manual, nor are they assembly instructions. They are meant for use by experienced, competent construction professionals with the ability to read, interpret, co-ordinate, interpolate and infer information from them. The Drawings do not indicate every component and assembly necessary to construct the Project. It is the Contractor's responsibility to provide all components and assemblies necessary to provide a safe, complete and finished Project, which is reasonably fit for its intended purpose, whether or not such components and assemblies are detailed on the Drawings.
- 1.1.5.2 In general, all drawings are diagrammatic and schematic, and cannot indicate every offset, fitting, and accessory, nor can they indicate the field coordination work required to avoid all conflict with other trades. Contractor shall check drawings, shop drawings, and actual equipment of other trades to verify spaces available and make reasonable modifications, as directed, without extra cost to Owner; maintain headroom and other requirements in all areas; and where such requirements appear inadequate, notify Architect/Engineer before proceeding.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following sentence to Paragraph 1.2.1:

It is the Contractor's responsibility to provide all work necessary for a complete and finished Project of first class quality. The Contractor will work skillfully, carefully and will perform in all respects in a workmanlike manner.

Add the following Paragraphs 1.2.2.1 and 1.2.3.1:

- 1.2.2.1 The Drawings are not intended to define the scope of work among various trades, sub-contractors, material suppliers and vendors. The sheet numbering system is for the convenience of the Architect and the Architect's consultants only, and is not intended to define a sub-contractor's or material supplier's scope of work. Information is detailed, described and located at various locations throughout the Drawings. No consideration will be given to requests for change orders which relate to a failure of the Contractor, or the Contractor's sub-contractors and suppliers to obtain and review a complete set of Contract Documents during bidding, nor to maintain a complete set of Contract Documents during bidding is separated into a number of different prime contracts, this paragraph applies to each of the separate prime contracts.
- 1.2.3.1 In the event of conflicts or discrepancies among the Contract Documents, interpretations will be based on the following priorities.
 - 1. The Agreement
 - 2. Addenda, with those of later date having precedence over those of earlier date.
 - 3. The Supplementary Conditions.
 - 4. The General Conditions of the Contract for Construction.
 - 5. Drawings and Specifications.

In the case of an inconsistency between Drawings and Specifications or within either Document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation. The Contractor has a duty to inquire about possible ambiguities and inconsistencies which are patent or obvious during the bidding process, and will not receive additional compensation or be excused from resulting difficulties in performance for failure to point out any inconsistencies after that point. In the case of disregard by the Contractor of such inconsistencies and ambiguities, the Architect may require the Contractor to remove and correct work which has been installed at no additional cost to the Owner.

ARTICLE 2 - OWNER

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

- 2.2.2 DELETE Subparagraph 2.2.2 in its entirety.
- 2.2.3 DELETE Subparagraph 2.2.3 in its entirety and replace with the following:

Neither the Owner nor the Architect shall be liable for inaccuracies or omissions contained in any surveys for the site of the Project, nor shall any inaccuracies or omissions in such items relieve the Contractor of its responsibility to perform the Work in accordance with the Contract Documents.

2.2.5 Replace Subparagraph 2.2.5 with the following:

The Contractor will be furnished free of charge ten (10) copies of Drawings and Project Manuals. Additional sets will be furnished at the cost of reproduction, postage and handling.

ARTICLE 3 - CONTRACTOR

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.4 ADD the following new Subparagraph:

The Contractor shall maintain total control of and shall be fully responsible for the Contractor's employees, agents, representatives, workers, Subcontractors, sub-subcontractors and other such persons or entities, and shall remove from the Site any such persons or entities not in compliance with the Contract Documents as interpreted by the Architect or the Owner. The Contractor shall assure harmonious labor relations at and adjacent to the Site so as to prevent any delays, disruption or interference to the Work. The Contractor shall prevent strikes, sympathy strikes, slowdowns, work interruption, jurisdictional disputes or other labor disputes resulting for any reason whatsoever, from the acts or failure to act, of the employees of the Contractor or any of its Subcontractors material suppliers, or other such persons or entities. The Contractor agrees that it will bind and require all of its Subcontractors, material suppliers and other such persons or entities to agree to all of the provisions of this subparagraph. If the Contractor or any of its Subcontractors, material suppliers or other such persons or entities fail to fulfill any of the covenants set forth in the Subparagraph, the Contractor will be deemed to be in default and substantial violation of the Contract Documents.

3.5 WARRANTY

Add the following new Subparagraphs 3.5.2, 3.5.3, 3.5.4, 3.5.5, 3.5.6, 3.5.7, 3.5.8 and 3.5.9.

- 3.5.2 For a period of one (1) year from the date of Substantial Completion, the Contractor warrants as provided in Subparagraph 3.5.1 and further warrants to the Owner, and the Architect that (a) all movable or adjustable work shall remain in working order, including hardware, doors, windows, apparatus, machinery, mechanical and electrical equipment and (b) the Contractor's portion of the Work shall be waterproof and weatherproof in every respect.
- 3.5.3 In addition to all the Contractor warranties and obligations to correct defective Work provided by law or as set forth in any of the Contract Documents, the Contractor agrees, upon notice from the Owner or the Architect, to pay for, and if requested, correct, repair, restore and cure any damage or injury, whenever the same shall occur or appear, resulting from any defects, omissions or failure in workmanship or materials, and indemnify, hold harmless, and defend the Owner against any and all claims, losses, costs, damages and expenses, including attorneys' fees, suffered by the Owner as a result of such damage or injury, whenever such damage or injury shall occur or appear.
- 3.5.4 The commencement and terms of the guarantees and warranties required by the Contract Documents shall not in any manner be affected by any delay in the commencement, progress or completion of the Work, regardless of the cause therefore.
- 3.5.5 The foregoing guarantees and warranties shall not shorten any longer warranty or liability period provided for by law or in the Contract Documents or otherwise received from the Contractor or any Subcontractor, material supplier or manufacturer, nor supersede the terms of any special warranty given by the Contractor, nor shorten any period of the Contractor's legal liability for defective Work, but shall be in addition thereto.
- 3.5.6 Notwithstanding anything to the contrary contained herein with respect to warranties, it is understood and agreed that the foregoing warranties and guarantees shall not affect, limit or impair the Owner's right against the Contractor with regard to latent defects in the Work which do not appear within the applicable warranty period and which could not, by the exercise of reasonable care and due diligence, be ascertained or discovered by the Owner within such warranty period. The Contractor shall be correct and cure any such latent defects which are reported to the Contractor by the Owner in writing within ninety (90) days after such latent defect first appears or could, by the exercise of reasonable care and due diligence, be ascertained or discovered by the Owner.

- 3.5.7 Neither the acceptance of any of the Work by the Owner, in whole or in part, nor any payment, either partial or final, by the Owner to the Contractor, shall constitute a waiver by the Owner of any claims against the Contractor for defects in the Work, whether latent or apparent, and no such payment or acceptance of the Work by the Owner shall release or discharge the Contractor of the Contractor's surety, if any, from any such claims for breach of such warranties.
- 3.5.8 Upon completion of the Work, the Contractor shall furnish the Owner with all written warranties, guarantees, operating manuals, all shop drawings and submittals used in the project relative to equipment installed, and if requested by the Architect, a complete set of reproducible drawings with all field changes noted on them relating to the improvements constructed.
- 3.5.9 If required by the Owner or the Architect, the Contractor shall deliver to the Owner a signed affidavit stating that the Work has been constructed in accordance with the Contract Documents. If such affidavit is required, final payment or a final certificate for payment shall not be tendered until such affidavit has been delivered to the Owner.

3.6 TAXES

3.6.1 ADD the following new Subparagraph:

Material purchased by contracts with the Owner that become a permanent part of the structure or facilities constructed will be exempt from State Gross Retail Tax (Sales Tax). Contractor shall prepare all purchase orders and documentation for direct payment by the Owner as required by Kentucky statutes to qualify for the sales tax exemption.

3.8 ALLOWANCES

Refer to Section 01210 - Cash Allowances for further provisions on this subject. Refer to Section 01220 - Contingency Allowance for further provisions on this subject.

3.12 SHOP DRAWINGS, PROJECT DATA AND SAMPLES

Refer to Section 01330 - Submittal Procedures for further provisions on this subject.

3.13 USE OF SITE

ADD the following new Subparagraphs 3.13.1 and 3.13.2:

- 3.13.1 If the Owner requires the contractor to relocate materials or equipment which have been stored on the Site or within the Project, the Contractor shall relocate such materials or equipment at no additional cost to the Owner.
- 3.13.2 The Contractor is solely responsible for its Site access. The Contractor shall keep all roads, walks, ramps and other areas on and adjacent to the Site in good working order and condition and free from obstructions which might present a hazard to or interference with traffic or the public. When construction operations necessitate the closing of traffic lanes, the Contractor shall be responsible for arranging such closings in advance with the authorities having jurisdiction, the Owner, and adjacent property Owners. The Contractor shall provide adequate barricades, signs and other devices for traffic guides and public safety. Contractor shall maintain all adjacent streets to that Project in a clean condition and shall clean all dirt and mud from the Project and from such adjacent street on a daily basis.

3.14 CUTTING AND PATCHING

Refer to Section 01732 - Cutting and Patching for further provisions on this subject.

3.15 CLEANING UP

Refer to Section 01740 - Cleaning for further provisions on this subject.

ARTICLE 6 - CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.2 MUTUAL RESPONSIBILITY

ADD the following new Subparagraphs 6.2.6 and 6.2.7:

- 6.2.6 No Contractor, other Contractor, or Subcontractor, shall be entitled or permitted to sue or make a claim against the Owner or the Architect on account of any delay, disruption or acceleration or damage related thereto. If, however, the Owner or the Architect is sued or receives a claim from a Contractor or other Contractor on account of any alleged delay, disruption, interference or acceleration or damage related thereto caused, or alleged to be caused, in whole or in part, by the Contractor, the Contractor shall defend and indemnify the Owner and the Architect therefore, and reimburse them for their attorney's fees, costs and expenses.
- 6.2.7 Inasmuch as the completion of the Project within the Contract Time is dependent upon the close and active cooperation of all those engaged therein, it shall be expressly understood and agreed that the Contractor shall lay out and install its Work at such time or times and in such manner as not to delay, interfere, or disrupt the Work of others.

ARTICLE 7 - CHANGES IN THE WORK

7.1 GENERAL

Add the following new Subparagraphs 7.1.4 and 7.1.5:

- 7.1.4 Consultants to Architect or Owner:
 - 1. Consultants to Architect or Owner shall have NO authority to modify Contract requirements in the Scope of Work or Contract Time.
 - 2. Consultants to Architect or Owner shall have no direct communication with Contractor or subcontractors, suppliers and vendors to Contractor without the express consent of the Architect.
 - 3. Any direct communication authorized by the Architect shall be for clarifications of the Work only and shall not act to authorize any changes in the Scope of Work, Contract Sum or Contract Time.
- 7.1.5 The overhead, profit and commission percentages included in a Change Order or Construction Change Directive must not exceed the maximums given at the end of this paragraph, and will be considered to include, but not be limited to, insurance (other than Workman's Compensation Insurance, FICA, Medicare and FUTA), bonds, small tools, incidental job burdens, supervisory expense, project management expense, clerical expense, preparatory expense and general office expense. Workmen's Compensation Insurance, and employment taxes under FICA, Medicare and FUTA are to be itemized separately and no percentage for overhead, profit and commission will be allowed on them. The percentages for overhead, profit and commission will be negotiated and may vary according to the nature, extent and complexity of the work involved, but not to exceed the maximum percentages shown. Not more than three percentages will be allowed regardless of the number of tiers of sub-contractors; that is, the markup on work subcontracted by a subcontractor will be limited to one overhead percentage and one profit percentage in addition to the prime contractor's commission percentage. On proposals covering both increases and decreases in the amount of the contract, the overhead, profit, and where applicable, commission, will be computed on the net change only. On proposals for decreases in the amount of the contract, the overhead and profit shall be added to the decrease in direct cost:

Description	Overhead	Profit	Commission
To Contractor on work performed by other than his/her own forces	0%	0%	10%
To Contractor for that portion of work performed by his/her own forces	10%	10%	0%
To Sub-contractor for that portion of work performed by his/her own forces	10%	10%	0%

7.3 CONSTRUCTION CHANGE DIRECTIVES

Add the following new Subparagraph to 7.3.7.6:

7.3.7.6 Amount for overhead and profit as set forth in this Agreement shall be in accordance with the schedule set forth in Article 7.1.5.

ARTICLE 8 - TIME

8.2 PROGRESS AND COMPLETION

ADD the following Subparagraphs 8.2.4, 8.2.5 and 8.2.6:

- 8.2.4 Whenever it may be useful or necessary for the Owner to do so, the Owner may take possession of the Project or parts thereof at any time that it is determined by the Architect that the Work has been completed to a point where the Owner may occupy or use said Project, or parts thereof, without interference, delay or disruption to the continued execution of the work. The Owner may at such time install furnishings and equipment as it sees fit or may at its discretion hire other Contractors for this purpose. Such use or occupation shall not relieve the Contractor or these warranty obligations as provided in the Contract Documents nor shorten their commencement dates.
- 8.2.5 Except as otherwise provided herein, substantial completion of work shall be within the number of calendar days stated by the Contractor on the Proposal Form and shall become a contract obligation. The time for completion of the work shall be extended for the period of any excusable delay, which term shall include only those delays directly caused by any of the reasons enumerated in the following subparagraph 8.3.2 and 8.3.3.
- 8.2.6 Completion shall be understood to be substantially complete for the Owner's beneficial occupancy, with only minor Punch List" items yet to be completed and items such as balancing of heating system, etc., which cannot be completed due to climatic conditions.

8.3 DELAYS AND EXTENSIONS OF TIME

DELETE Subparagraph 8.3.1 in its entirety and substitute the following:

8.3.1 If the Work is delayed, disrupted, interfered with our constructively accelerated (hereinafter and collectively referred to as "Hindrance" or "Hindrances") at any time by any act or neglect of the Owner, the Architect, other Contractors or Subcontractors, or any of their employees, or by changes ordered in the Work, fire, unusual delay in transportation, unavoidable casualties, or other cause beyond the Contractor's control as elsewhere provided in the Contract Documents, then the Contract Time shall be

increased by Change Order for such reasonable time as the Architect may determine.

DELETE Subparagraph 8.3.3 in its entirety and substitute the following:

8.3.3 Whether or not any Hindrance shall be the basis for an increase in the Contract Time, the Contractor shall have no claim against the Owner or the Architect for an increase in the Contract Sum, nor a claim against the Owner or the Architect for a payment or allowance of any kind for damage, loss or expense resulting from any Hindrance. As between the Contractor and the Owner, except for acts constituting intentional or grossly unreasonable interference by the Owner or the Architect with the Contractor's performance of the Work when such acts continue after the Contractor's written notice to the Owner of such interference or disruption, the Contractor shall assume the risk of all Hindrances arising from any and all causes whatsoever, including without limitation, those due to any act or omission of the Owner or the Architect, except only to the extent that an increase to the Contract Time may be due to the Contractor as expressly provided for in this Subparagraph. The Contractor shall bear all costs, expenses and liabilities in connection with Hindrances and all costs, expenses and liabilities of any nature whatsoever, whether or not provided for in the Contract Documents, shall conclusively be deemed to have been within the contemplation of the parties. The only remedy available to the Contractor shall be an increase in the Contract Time.

ADD the following new Subparagraphs 8.3.4, 8.3.5 and 8.3.6:

- 8.3.4 The Owner's exercise of any of its rights under the Contract Documents, including but not limited to its rights regarding changes in the Work, regardless of extent or number of such changes, performance of separate Work or carrying of the Work by the Owner or the Architect, directing overtime or changes in the sequence of the Work, withholding payment or otherwise exercising its rights hereunder, or exercising any of its remedies of suspension of the Work or requirements of correction or re-execution of any defective Work shall not, under any circumstances, be construed as intentional interference or disruption with the Work.
- 8.3.5 No increase in the Contract Time shall be granted for any Hinderance resulting from unsuitable ground conditions, inadequate forces, the failure of the Contractor to place orders for equipment or materials sufficiently in advance to insure their delivery when needed, or any Hinderance resulting from interruptions to or suspensions of the Work so as to enable others to perform their Work, other than as specifically provided elsewhere in the Contract Documents.
- 8.3.6 If the Contractor causes a Hinderance to the Work so as to cause any damage to the Owner or any damages for which the Owner may become liable, the Contractor shall be liable therefore and the Owner may withhold from any amount yet due the Contractor the amount reasonably required to compensate the Owner for such damages, if the amount of compensation exceeds the amount yet paid to the Contractor, the Contractor shall pay the difference to the Owner immediately upon demand.

ARTICLE 9 - PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Add the following new Subparagraph 9.2.2:

9.2.2 Contractor shall obtain written concurrence in such schedule of values from the Surety furnishing any Performance Bond and Labor and Materials Payment Bond. Copy of written concurrence by the Surety shall be submitted by the time of written submission.

9.3 APPLICATIONS FOR PAYMENT

ADD the following new Subparagraphs: 9.3.1.3, 9.3.1.4, 9.3.1.5, and 9.3.1.6:

- 9.3.1.3 The Owner will pay ninety-five percent (95%) of the amount due the Contractor on Account of progress payments for the entire period of the Contract.
- 9.3.1.4 A subcontractor shall be paid ninety-five percent (95%) of the earned sum by the Contractor for the entire period of the Contract.
- 9.3.1.5 The Owner, Contractor and the Architect/Engineer shall cooperate to the end that retentions shall be paid promptly when all conditions of the Contract have been met.
- 9.3.1.6 Applications for payment, subsequent to the first application, shall be accompanied by Waivers of Lien from the Contractor and all major subcontractors, suppliers, and vendors.

ADD the following at the end of Subparagraph 9.3.3:

9.3.3 This provision shall not be construed as relieving the Contractor from the sole responsibility and expense for the care and protection of materials and Work upon which payments have been made or the restoration of any stolen, destroyed or damaged Work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the Contract Documents.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

ADD the following new Subparagraph 9.5.4:

9.5.4 If any claim or lien is made or filed with or against the Owner, the Architect, the Project, or the Contract Sum by any persons or entity claiming that the Contractor or and Subcontractor or other person for whom the Contractor is responsible has failed to make payment for labor, services, materials, equipment, taxes or other items or obligations furnished or incurred for or in connection with the Work, or if at any time there shall be any evidence of such non-payment or of any claim or lien which is chargeable to the Contractor, or if the Contractor or any Subcontractor or other person or entity for whom the Contractor is responsible caused damage to the Work or to any other Work on the project, or if the Contractor fails to perform or is otherwise in default under any of the terms or provisions of the Contract Documents, the Owner shall have the right to retain from any payment then due or thereafter to become due an amount which it deems sufficient to (1) satisfy, discharge and/or defend against such claim or lien or any action which may be brought or judgment which may be recovered thereon, (2) make good any such non-payment, damage, failure or default, and (3) compensate the Owner and the Architect for any and all losses, liabilities, damages, cost and expenses, including legal fees and costs, which may be sustained or incurred by either or both of them in connection therewith. The Owner shall have the right to apply and charge against the Contractor so much of the amount retained as may be required for the foregoing purposes. If the amount retained is insufficient therefore, the Contractor shall be liable for the difference and shall pay the difference to the Owner.

9.6 **PROGRESS PAYMENTS**

DELETE Subparagraph 9.6.6 in its entirety and replace with the following:

9.6.6 No recommendation or certification of a progress payment, any progress payment, final payment, or any partial or entire use or occupancy of the Project by the Owner, shall constitute acceptance of any Work not in accordance with the Contract Documents.

9.9 PARTIAL OCCUPANCY OR USE

9.9.1 DELETE the phrase "when such portion is designated by separate agreement with the Contractor" in line

2; DELETE the last two sentences in Subparagraph 9.9.1.

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 ADD the following sentence at the end of the Subparagraph:

"Provided, however, that final payment shall not be due and payable until sixty-one (61) days after the Work has been completed and the Contract fully performed".

9.10.4 ADD the following at the end of Subparagraph 9.10.4:

"Final payment constituting the unpaid balance of the Contract Sum shall be paid to the Contractor in full, no less than sixty-one (61 days) following the date of substantial completion. If at any of that time there are any remaining uncompleted items, an amount equal to two hundred percent (200%) of the value of each item as determined by the Architect shall be withheld until said items are completed and a Final Certificate of Payment is issued by the Architect".

DELETE Subparagraph 9.10.5 in its entirety and replace with the following:

9.10.5 The Contractor's obligation to perform the Work and complete the Project in accordance with the Contract Documents shall be absolute. Neither approval of any progress or final payment, nor the issuance of a Certificate of Substantial Completion, nor any payment by the Owner to the Contractor under the Contract Documents, nor any use or occupancy of the Project or any part thereof by the Owner, nor any act of acceptance by the Owner shall constitute an acceptance of Work not in accordance with the Contract Documents, nor does it constitute a waiver of any claims that arise from: (1) liens, claims, security interests or encumbrances arising out of the contract or settled; or (2) terms of any warranties in favor of the Owner that are provided pursuant to the Contract Documents or otherwise.

ARTICLE 10 - PROTECTION OF PERSONS AND PROPERTY

DELETE Subparagraph 10.1.1 in its entirety and replace with the following:

10.1.1 The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work and in connection with the Contractor's performance of any work other than the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 REPLACE the words "reasonable" with the phrase "all necessary" in both instances in line 1.

ADD the following to Subparagraph 10.2.1:

- .4 Protect excavation, trenches, buildings and grounds from all water damage. Furnish necessary equipment to provide this protection during the term of the Contract. Construct and maintain necessary temporary drainage to keep excavations free of water.
- .5 Provide protection of the Work against wind, storms, cold and heat. At the end of each day, cover new Work which may be damaged;
- .6 Provide adequately-engineered shoring and bracing required for safety and for the proper execution of the Work and have same removed when the Work is completed; and
- .7 Protect, maintain and restore benchmarks, monuments and other reference points affected by the Work. If benchmarks, monuments or other reference points are displaced or destroyed, points shall be re-established and markers reset under the supervision of a licensed surveyor, who shall furnish certificates of its work.

10.2.5 INSERT the work "solely" after the word "loss" in the clause which reads "except damage or loss attributable to acts or omissions of the Owner or Architect...".

ADD the following new Subparagraphs 10.2.9, 10.2.10 and 10.2.11:

- 10.2.9 "The Project is designed to be self-supporting and stable after the Work is fully completed. Except as otherwise provided, it is solely the Contractor's responsibility to determine erection procedures and sequences, and to insure the safety of the Project and its component parts during erection. This includes, but is not limited to, the addition or modification of whatever temporary bracing, guys or tie downs may be necessary. Such material shall be removed after completion of the Work".
- 10.2.10 The Contractor shall conform with the United States Department of Labor and the State Division of Labor Occupational Safety and Health Administration regulations.
- 10.2.11 The Contractor shall have the Hazard Communication Program in effect with all their personnel working on the project. All Material Data sheets should be current as required by law.

ARTICLE 11 - INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

- 11.1.2 Add the following limits of liability:
 - .1 Workmen's Compensation statutory. Employer's Liability - \$100,000.
 - .2 Comprehensive General Liability (including Premises Operations, Independent Contractor's Protective, Products and Completed Operations, Broad Form Property Damage):
 - Bodily Injury:
 \$1,000,000 one person aggregate per project endorsement. CG2503 to be included
 \$1,000,000 annual aggregate.
 - b. Property Damage:
 \$500,000 each occurrence.
 \$1,000,000 annual aggregate.
 - c. Property Damage Liability Insurance shall include coverage for
 - the following hazards: X (Explosion, C (Collapse), U (Underground).
 - d. Wavier of subrogation to be included
 - e. Additional insured form CG2010 to be included
 - .3 Contractual Liability (Hold Harmless Coverage).
 - a. Bodily Injury:
 - \$1,000,000 each occurrence
 - b. Property Damage: \$500,000 each occurrence \$500,000 aggregate
 - .4 Personal Injury, with employment exclusion deleted:

\$1,000,000.

- .5 Comprehensive Automobile Liability (Owned, Non-Owned, Hired):
 - a. Bodily Injury: \$1,000,000 each person.
 - \$1,000,000 each accident
 - b. Property Damage:
 - \$500,000 each occurrence.
 - c. Owner to be named as additional insured and provided a Waiver of Subrogation.

- .6 Catastrophic Umbrella Coverage, including products complete operations: \$2,000,000
- .7 Prime Contractors and all subcontractor's insurance shall be primary and non-contributory on all insurance.

Add the following new Subparagraph 11.1.5:

11.1.5 The Contractor shall furnish one copy of Certificate of Insurance. Furnish Owner copies of any endorsements subsequently issued amending coverage limits.

11.3 **PROPERTY INSURANCE**

11.3.1 Change the last sentence to ADD: "Architects and Engineers of Record after "Subcontractors".

ADD the following new Subparagraph 11.3.7.1:

- 11.3.7.1 Any errors and omissions insurance maintained by the Architect or the Architect's Consultants shall not serve to exclude the Architect or Architect's Consultant from the mutual waiver of rights outlined in paragraph 11.3.7. The waiver of rights is given in exchange for property insurance covering the work.
- 11.3.9 DELETE Subparagraph 11.3.9 in its entirety.
- 11.3.10 DELETE all words following "insurers" in the first line and put a "." after "insurers".

ARTICLE 13 – MISCELLANEOUS PROVISIONS 13.2 SUCCESSORS AND ASSIGNS

13.2.1DELETE the last two sentences of this Subparagraph.ADD the following as the last two sentences of the Subparagraph:

"Contractor shall not assign the Contract or any portion thereof without the written consent of Owner. Owner is entitled to assign the Contract or any portion thereof".

13.2.2 DELETE this Subparagraph in its entirety.

13.5 TESTS AND INSPECTIONS

ADD the following new Subparagraph 13.5.7:

13.5.7 Neither the observations of the Architect, its administration of the Contract Documents, nor inspections tests or approvals by persons other than the Contractor shall relieve the Contractor from its obligation to perform the Work in accordance with the Contract Documents.

ADD the following new Paragraph 13.9:

13.9 There shall be no smoking or tobacco use allowed within the buildings, on the project site or anywhere within the project property. Violators shall be removed from the project immediately.

Any construction materials in contact with or exposure to such tobacco products shall be removed and replaced with new, at the Contractor's expense.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

DELETE Subparagraph 14.1.1 in its entirety and replace with the following::

- 14.1.1 If the Work is stopped for a period of sixty (60) days under an order of any court or other public authority having jurisdiction, or as a result of any act of government such as a declaration of a national emergency making material unavailable, through no act or failure to act of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, and the Owner has not otherwise suspended, delayed, disrupted or interrupted the Work in accordance with the Subparagraph, then the Contractor may, upon fourteen (14) days' written notice to the Owner, terminate the Contract, and recover from the Owner payment for all Work executed to date. Recovery by the Contractor of lost anticipated profit and overhead and other consequential and incidental damages is hereby specifically excluded.
- 14.1.3 DELETE all words following the words "payment for" and ADD the following after "payment for":

"all work executed to date. Recovery by the Contractor of last anticipated profit and overhead and other consequential and incidental damages is hereby excluded."

ADD the following new Subparagraph 14.1.5:

14.1.5 "The Owner shall not be liable to the Contractor for the Owner's failure to perform its obligations set forth herein if such performance is prevented or interrupted by war (including the consequences thereof), fire, tornado, hurricane, windstorms, labor problems, fuel or transportation shortages, civil unrest, governmental action, or any other natural or economic disaster or cause which is reasonably beyond the control of the Owner ("Force Majeure"). If the estimated duration of the Force Majeure is one year or more, the Contractor shall have the option to terminate this Contract upon thirty (30) days' written notice. In the event that the estimated duration of the Force Majeure is less than one year, the Contract Time shall be increased by the same length of time as the Force Majeure persisted.".

14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

- 14.3.1 DELETE this Subparagraph in its entirety.
- 14.3.2 DELETE this Subparagraph in its entirety.

14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

14.4.3 DELETE the words ", and cost incurred by reason of such termination" and REPLACE with "reimbursable costs actually incurred."

DELETE the words "reasonable overhead and profit on" in the second line and REPLACE with "and an amount representing six percent (6%) of the amount of the work not executed".

END OF SECTION 00811

SECTION 01110 - SUMMARY OF WORK – SINGLE CONTRACT

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Work covered by the Contract Documents.
 - 2. Contractor's use of premises.
 - 3. Coordination of work and trades.
 - 4. Owner occupancy during construction.
 - 5. Partial occupancy of completed work.
 - 6. Construction scheduling and phasing.
- B. Project is being bid with construction work under one General Contract for all trades.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. The Contract Documents apply to the work of this Section.
- Additional requirements necessary to complete the work may be found in other documents.
- B. Section 00700 General Conditions
- C. Section 00810 Supplementary General Conditions
- D. Division 1, General Requirements.

1.03 WORK COVERED BY CONTRACT DOCUMENTS

- A. Provide and pay for all materials, labor, services, equipment, licenses, permits, fees, taxes, and other items necessary for the execution, installation and completion of Work indicated in Contract Documents.
- B. The Work includes coordination with Architect, Owner's Representative, Owner's separate contractors, material suppliers and vendors.

1.04 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit his use of premises for work and storage, to allow for Owner's occupancy as identified in this Section.
- B. Assume full responsibility for protection and safekeeping of products stored on premises.
 - 1. Move any stored products that interfere with operations of Owner or other Contractor.
 - 2. Obtain and pay for use of additional storage or work areas needed for operations.
 - 3. Available space for construction field offices and storage sheds is limited to the project site. Contractor must arrange for off site storage as required.
- C. Contractor shall allow for any other work outside of this contract, whether by Owner's personnel or Contractors under Owner's separate contracts, to proceed without delay or impediment.

1.05 <u>COORDINATION</u>

- A. Schedule, manage and expedite all work under his Contract, coordinating his work with his sub-contractors, material suppliers, vendors, and trades so that no conflicts of timing or location occur.
 - Work shall progress according to approved progress schedule. Schedule dates for incorporation of work, and identify all critical path events and dates.
 - 2. Coordinate and provide all floor, ceiling, roof, and wall sleeves.
 - 3. Provide all cutting, fitting or patching required.
- B. Keep Architect informed on the progress of the work.
 - 1. Close or cover no work until duly inspected and approved.
 - 2. Uncover un-inspected work and after approval, repair and/or replace all work at no cost to Owner.

- 3. Notify Architect at least 7 days in advance of utility connections, utility shut-offs, mechanical equipment and oil line cutovers, street or alley closings to allow ample time to receive Owner's written approval of procedure to be followed.
- 4. Coordinate all operations with the Architect and Owner. Complete in the minimum amount of time.
- C. Protection:
 - 1. Do not close or obstruct streets, entrance drives, sidewalks or other facilities without permission of the Owner and local authorities.
 - 2. Conduct operations with minimum interference.
 - 3. Furnish, erect and maintain barricades, warning lights, signs and guards as may be required.

1.06 <u>OWNER OCCUPANCY</u>

- A. Site will be vacated by Owner prior to Notice-to-Proceed for Contractor's complete use of site during construction.
- B. Cooperate with Owner or his representative in all construction operations to minimize conflict and to facilitate Owner's usage of building.
- C. Conduct construction operations to assure least inconvenience to Owner and public.
- D. Provide temporary heating and ventilation, temporary dust partitions, plastic sheeting, plywood sheeting, and any other means required to protect all elements of existing building from damage or deterioration during construction.

1.07 PARTIAL OCCUPANCY

- A. Prior to occupancy, execute Certificate of Substantial Completion for designated area.
- B. Contractor provide: Access for Owner's personnel.
- C. Owner provides, upon occupancy:
 - 1. Maintenance
 - 2. Operation of HVAC, electrical systems.
 - 3. Security.

1.08 CONSTRUCTION SCHEDULING AND PHASING

- A. Owner intends to award the Contract and issue a Notice to Proceed within 60 days after bid opening.
- B. Contractor shall mobilize on site and begin work immediately thereafter.
- C. Contractor must achieve Substantial Completion by "to be determined".
- D. Contractor must achieve Final Completion by "to be determined".

END OF SECTION 01110

SECTION 01130 - GENERAL CONSTRUCTION REQUIREMENTS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Special Provisions.
 - 2. Commencement Activity.
 - 3. Quality Control.
 - 4. Pre-final and Final/Occupancy Inspections
 - 5. Project Closeout.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. The Contract Documents apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- B. Section 01110 Summary of Work Single Contract
- C. Section 01300 Project Meetings
- D. Section 01310 Project Management and Coordination
- E. Section 01320 Construction Progress Documentation
- F. Section 01640 Owner Furnished Equipment

1.03 SPECIAL PROVISIONS

A. Project:

The Project is the total construction for which the Contractor is responsible, including all labor, materials and equipment used or incorporated in such construction.

B. Work:

The Work comprises the completed construction designed under the Project and includes labor necessary to produce such construction, and materials and equipment to be incorporated in such construction.

- C. Contract Documents includes the following (See General Conditions 1.1.1 for definition):
 - 1. Project Manual. (See General Conditions 1.1.7 for definition) The Project Manual is composed of the following:
 - a. The Bidding Requirements.
 - b. The Contract Forms.
 - c. The Conditions of the Contract.
 - d. The Specifications. (See General Conditions 1.1.6 for definition)
 - 2. Drawings (See General Conditions 1.1.5 for definition)
 - 3. Addenda (See Instructions to Bidders 1.3 for definition)
 - 4. Other Documents as identified in the Contract for Construction, the General Conditions of the Contract for Construction, and Supplementary General Conditions
- D. Demolition:

All existing Improvements on the site indicated on the Drawings to be demolished, shall be removed by Contractor. Use such methods as required to complete the work in compliance with all governing authorities and utility company requirements. All existing utility connections shall be disconnected, properly capped and removed by the Contractor. Complete removal of existing foundation walls or footings is required under new construction or other new foundations. Remove all below-grade wood and metal. Any existing basements, cisterns and/or other below grade voids shall be filled with compatible fill material suitable for proposed constructions and compacted per specific requirements. Completely remove cisterns located under new construction. All debris, rubbish, salvage and other materials shall be removed from the site. Protect all adjacent properties and structures, and existing buildings from damage.

E. Utilities:

It is the Contractor's responsibility to coordinate with the appropriate utility companies actual location of mains serving the site and route the building utility lines in the most direct route.

- 1. The location of utilities existing in the building as indicated on the Drawings may be modified by the Contractor to accommodate a more direct route to the utility connection location with written approval from Architect.
- F. Permits and Fees:

The Contractor is responsible for verifying any and all fees required from all utilities, agencies and authorities having jurisdiction. The Contractor shall obtain and pay for the Building Permit and all other permits and governmental fees, licenses and inspections required, whether specifically referenced or not. The Contractor is to include in the bid the cost of all charges payable to State, local or special community development agencies and any additional fees as required for the completion of the project, including, but not limited to:

- 1. Water company connection fees and charges
- 2. Electrical company charges.
- 3. Telephone company charges.
- 4. Sanitary sewer connection fees and charges.
- 5. Gas Company charges.
- 6. Fire sprinkler connection fees and charges.
- G. Historical and Archeological Finds: All items having any apparent historical or archeological interest discovered in the course of construction must be carefully preserved. The Contractor must leave the archeological find undisturbed and immediately report it to the Architect. Work on the project may be stopped until such find is analyzed, inspected and removed by the Governing Authority.

1.04 COMMENCEMENT ACTIVITY

A. Evidence that the Contractor has started procurement of materials, preparation and submission of shop drawings, preparation of subcontracts and other preparatory work must satisfy the requirement that work began upon receipt of Notice to Proceed.

1.05 QUALITY CONTROL

- A. Testing:
 - 1. Employ the services of an independent testing laboratory to take samples, perform tests and make inspections. The costs for such laboratory and tests shall be borne by the Contractor.
 - 2. Submit testing reports as per Architect.
 - 3. Refer to Section 01400-Quality Control for additional requirements.

1.06 PRE-FINAL AND FINAL/OCCUPANCY INSPECTIONS

- A. The Contractor is to notify in writing, the Architect, that the work is complete for a Pre-Final Inspection (also referred to as "Final Punchlist Inspection". The Contractor must provide the Architect at least 10 calendar days advance notice.
- B. The Contractor is to diligently complete all punchlist items before a Final/Occupancy Inspection is scheduled.

1.07 PROJECT CLOSEOUT

- A. Cleaning during construction:
 - The premises and the job site shall be maintained in a reasonable neat and orderly condition and kept free from accumulations of waste materials and rubbish during the entire construction period. Remove crates, cartons, and other flammable waste materials or trash from the work areas at the end of each working day. Do not allow debris to blow onto adjoining properties. Respond immediately to request from adjoining property owners to remove any debris that does manage to show up on adjoining properties.
 - 2. Maintain the project in clean condition until the Owner accepts the building.
 - 3. Refer to Section 01740 Cleaning for additional requirements.

B. Closeout Procedures: Refer to Section 01770 - Closeout Procedures for additional requirements.

- C. Closeout Submittals:
 - Before the project can be closed out, the Contractor shall have provided all submittals required by the Contract Documents. All submittals required by the Contract Drawings or Specifications shall be sent to the Architect for review and coordination, in accordance with the requirements of the respective Drawing or Specification section. Any items that the Architect determines are incomplete or incorrect shall be corrected and resubmitted.
 - 2. Refer to Section 01780 Closeout Submittals for additional requirements.
 - 3. Refer to Section 01781 Closeout Maintenance Materials for additional requirements.
- D. Retainage:
 - The Architect will assign a monetary value to all punchlist items not completed, and to all required submittals not received, as of the date of "Final Acceptance" and an amount equal to 200 percent of the total value of those items shall be retained and/or deducted from the Contractor's final payment until the Contractor demonstrates to the Architect's satisfaction that such items have been completed or corrected. Refer to the General Conditions and Supplementary General Conditions for additional information regarding retainage.

END OF SECTION 01130

SECTION 01210 - CASH ALLOWANCES

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Schedule of allowances in Contract Sum for purchase of products, unless installation is also specified.
 - 2. Contractor's costs included in Allowances.
 - 3. Contractor's costs included in Contract Sum.
 - 4. Architect Responsibilities.
 - 5. Contractor's Responsibilities.
 - 6. Correlation with contractor submittals.
 - 7. Adjustment of allowances.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 01110 - Summary of Work - Single Contract Section 01370 - Schedule of Values Individual Sections as listed in Schedule Allowances

1.03 SCHEDULE OF ALLOWANCES

- A. Brick Allowance:
 - 1. Allow a lump sum fee of **\$800** per thousand.
 - 2. To be used for purchase and delivery of material to site.
 - 3. Contractor to furnish brick count in thousands required to complete project.
 - 4. To be included in Base Bid of Contract.
 - 5. Refer to Section 04210 Face Brick Masonry.
- B. Awning Allowance:
 - 1. Allow a Lump Sum Fee of \$60,000.
 - 2. Itemize on Application and Certificate for Payment.
 - 3. To be included in Base Bid of Contract.

1.04 CONTRACTOR'S COSTS INCLUDED IN ALLOWANCES

- A. Cost of product of Contractor and/or subcontractor, less applicable trade discounts.
- B. Delivery to Site.
- C. Applicable taxes.
- D. Labor for installation, if specified as such.

1.05 CONTRACTOR COSTS INCLUDED IN CONTRACT SUM

- A. Product handling at site, including unloading, uncrating, and storage.
- B. Protection of products from elements and from damage.
- C. Labor for fabrication, installation and finishing, except when installation is specified as part of allowance.
- D. Other expenses required to complete installation.
- E. Contractor's overhead and profit.

1.06 ARCHITECT RESPONSIBILITIES

A. Consult with Contractor in consideration of products, suppliers and installers, as applicable.

- B. Select products, obtain Owner's written decision and transmit full information to Contractor.
 - 1. Manufacturer, product, model or catalog number, accessories, attachments, and finishes.
 - 2. Supplier and installer as applicable.
 - 3. Cost to contractor, delivered to site and installed as applicable.

1.07 CONTRACTOR RESPONSIBILITIES

- A. Assist Architect in determining suppliers and installers, and obtain applicable proposals when requested.
- B. Make recommendations for Architect's consideration.
- C. Promptly notify Architect of any reasonable objections against supplier or installer.
- D. Upon notification of selection, execute purchase agreement with designated supplier and installer, as applicable, just as with any other subcontractor or supplier on the project.
- E. Arrange for processing of shop drawings, product data, and samples.
- F. Arrange for delivery. Promptly inspect products upon delivery for completeness, damage, and defects.
- G. Install, adjust and finish products.
- H. Provide warranties for products and installation.

1.08 CORRELATION WITH CONTRACTOR SUBMITTALS

A. Schedule shop drawings, product data, samples, and delivery dates, in Progress Schedule for products selected under allowances.

1.09 ADJUSTMENT OF ALLOWANCES

- A. Contractor shall submit proposal to Architect for any proposed change to allowances.
- B. Provide supportive data as required by Architect to substantiate costs of items included in allowances.
- C. All proposals shall be authorized by the Architect prior to execution and recorded in Contractor's as-built drawings and Architect's project record documents.
- D. Adjustment to Allowances will be made by Change Order. Any unused amounts to be credited back to the Owner.

END OF SECTION 01210

SECTION 01220 - CONTINGENCY ALLOWANCE

PART 1 - GENERAL

- 1.01 <u>REQUIREMENTS INCLUDED</u> A. Section Includes:
 - 1. Contingency Allowance in Contract Sum.
- 1.02 <u>RELATED REQUIREMENTS SPECIFIED ELSEWHERE</u> Section 01110 - Summary of Work - Single Contract Section 01370 - Schedule of Values

1.03 CONTINGENCY ALLOWANCE

- A. Allow a lump sum fee of *\$100,000*.
- B. To be included in the Base Bid of Contract.
- C. Itemize Contingency Allowance on Application and Certificate for Payment and Schedule of Values.
- D. Contingency Allowance to be used for unforeseen conditions encountered during the work.
- E. Do not include any contractor's additional costs in bid.
 Adjustments to contingency allowance will include labor, material, transportation, overhead and profit.
 All costs for these items to be included in all proposals to Architect for adjustments to contract.
- F. Use Funds in Contingency Allowance only on written agreement between Owner, Architect and Contractor.
- G. All Proposals shall be authorized by the Architect prior to execution and recorded in Contractor's as-builts and Architect's project Record Documents.
- H. Adjustment to Allowances will be made by Change Order. Any unused amounts to be credited back to the Owner.

END OF SECTION 01220

SECTION 01230 - ALTERNATES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Procedures for exercising alternates.
 - 2. Identification and description of alternates.
- B. All items, either indicated on the Drawings or specified in the Project Manual, not specifically indicated to be included in a specific alternate is to be included within the base bid scope of work.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. Bidding Requirements: Quotation of cost for each alternate as listed on Proposal Form.
- B. Owner-Contractor Agreement: Alternates accepted by Owner for incorporation into the work.
- C. Sections of Specifications identified by work of each alternate.

1.03 PROCEDURES

- A. Alternates will be exercised at the option of Owner.
- B. Coordinate related work and modify surrounding work as required to complete the Work, including changes under each Alternate, when acceptance as designated in Owner-Contractor Agreement.
- C. All Alternates shall be bid. Base Bid to be all work as shown on the Drawings and Specifications, except Alternates.
- D. Owner reserves the right to accept or reject any and all Alternates as determined solely at the discretion of the Owner. Alternates may be accepted or rejected independently from one another, and in any order of priority or hierarchy as determined by the Owner.

1.04 <u>SCHEDULE OF ALTERNATES</u>

A. ALTERNATE NO. 1: TENANT BUILD OUT

- 1. Give the amount to be ADDED to the Base Bid if tenant build-out spaces are constructed in accordance with the Contract Documents per drawing G-201
- 2. Base Bid includes building shell, common spaces and demising wall framing.

B. ALTERNATE NO. 2: WEST PARKING LOT

- 1. Give the amount to be ADDED to the Base Bid if the West Parking Lot Improvements and West Parking Lot new lighting are provided in accordance with the Contract Documents shown on drawings C-002, C-101, C-102 and U-103
- 2. Base Bid includes no improvements to west parking lot

C. ALTERNATE NO. 3: DEMOLITION OF EXISTING BUILDING

- 1. Give the amount to be ADDED to the Base Bid if the rear portion of the existing church building where indicated on the site plan is completely demolished in accordance with the Contract Documents. See drawing C-002.
- 2. Base Bid does not include building demolition.

D. ALTERNATE NO. 4: KYNAR FINISH

- 1. Give the amount to be ADDED to the Base Bid if a Kynar finish is substituted for a clear anodized finish on aluminum entrances and storefronts; and glazed aluminum curtain wall system in accordance with the Contract Documents.
- 2. Base Bid includes clear anodized finish on all aluminum entrances and storefronts and curtainwall

E. ALTERNATE NO. 5: PROJECT SECURITY

- 1. Give the amount to be ADDED to the Base Bid if "Project Security" is added to the project in accordance with Section 01350 Project Security and the Contract Documents.
- 2. Base Bid includes normal security requirements of the contract documents.

F. ALTERNATE NO. 6: SYNTHETIC STONE

- 1. Give the amount to be ADDED to or DEDUCTED from the Base Bid if "Synthetic Stone" as specified in Section 04730 Synthetic Stone is substituted for "Cut Stone" as specified in Section 04420 Cut Stone in accordance with the Contract Documents.
- 2. Base Bid includes Cut Stone only.

END OF SECTION 01230

SECTION 01300 - PROJECT MEETINGS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Contractor participation in pre-bid conference, pre-construction conferences, progress meetings, and pre-installation meetings.
 - 2. Architect shall schedule and chair Project Meetings and prepare summary minutes for distribution by Contractor to all in attendance.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- Section 01130 General Construction Requirements
- Section 01310 Project Management and Coordination
- Section 01320 Construction Progress Documentation
- Section 01330 Submittal Procedures
- Section 01400 Quality Control
- Section 01770 Closeout Procedures
- Section 01780 Closeout Submittals

Individuals Specification Sections: Pre-installation conference

1.03 PRE-BID CONFERENCE

A. Architect will administer pre-bid conference to provide further understanding of Scope of Work.

B. Attendance:

- 1. Architect.
- 2. All prospective bidding Contractors, Subcontractors, Suppliers and Vendors.
- 3. Attendance is not required, but strongly encouraged.

C. Agenda:

- 1. Review Notice-to-Bidders.
- 2. Review Bid Requirements and Contractor's Bid Submittal Checklist.
- 3. Review Summary of Work.
- 4. Review Construction Document set.
- 5. Review Project Site (if necessary).
- 6. Questions and Answers.
- D. Architect will notify all bidders as to time and place of Pre-Bid Conference.

1.04 PRE-CONSTRUCTION CONFERENCES

- A. Architect will administer pre-construction conference.
- B. Attendance:
 - 1. Architect.
 - 2. Owner's Representative.
 - 3. Contractor's Project Manager.
 - 4. Contractor's Job Superintendent.
- C. Agenda:
 - 1. Execution of Owner-Contractor Agreement.
 - 2. Exchange of preliminary submittals.
 - 3. Submission of executed bonds and insurance certificates.

- 4. Distribution of Contract Documents.
- 5. Submission of Schedule of Values. (If not required before hand).
- 6. Designation of personnel representing the parties in Contract.
- 7. Procedures and processing of Requests for Information, field decisions, submittals, substitutions, Applications for Payment, proposal requests, Change Orders, and contract closeout procedures.
- 8. Scheduling.
- 9. Construction facilities and temporary controls.
- 10. Notice to Proceed.
- D. Architect will record minutes and distribute copies to Contractor and Owner and those affected by decisions made. Contractor is responsible for distribution of copies to Subcontractors, Suppliers and Vendors.
- E. Architect will administer mobilization conference at Project site for clarification of Contractor responsibilities in use of site and for review of administrative procedures.

1.05 PROGRESS MEETINGS

A. Architect shall schedule and administer Project Meetings throughout progress of the Work not less frequently than every month. Additional Project Meetings shall be scheduled as appropriate to construction activity.

B. Attendance:

- 1. Architect.
- 2. Owner's Representative.
- 3. Contractor's Project Manager.
- 4. Contractor's Job Superintendent.
- 5. Major Subcontractors and Suppliers.
- 6. Contractor's Quality Control Representative.
- 7. Others as appropriate to agenda topics.
- C. Agenda:
 - 1. Review of and corrections to minutes of previous meetings.
 - 2. Review of Work progress and/or payment progress.
 - 3. Field observations, problems, and decisions.
 - 4. Identification of problems which impede planned progress.
 - 5. Review of submittals schedule and status of submittals.
 - 6. Review of off-site fabrication and delivery schedules.
 - 7. Maintenance of progress schedule.
 - 8. Corrective measures to regain projected schedules.
 - 9. Planned progress during succeeding work period.
 - 10. Coordination of projected progress.
 - 11. Maintenance of quality and work standards.
 - 12. Effect of proposed changes on progress schedule and coordination.
 - 13. Status of pending changes and substitutions.
 - 14. Other business relating to Work.
 - 15. Review of Construction Progress Documentation.
- D. Architect will record minutes and distribute copies to Owner and Contractor. Contractor shall distribute copies to all others.
- E. Contractor shall hold separate meetings with workers, sub-contractors and suppliers to coordinate means and methods of construction, and jobsite safety. Do not use Owner/Architect Progress Meetings

for such purpose.

1.06 PRE-INSTALLATION MEETINGS

- A. When required in individual specification sections or as determined necessary by Architect, convene a pre-installation meeting at work site prior to commencing work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify Architect seven days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
 - 3. Agenda items listed in individual specification Sections.
 - 4. Installation schedule.
- E. Architect will record minutes and distribute copies to participants, and those affected by decisions made.

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Administrative and supervisory personnel.
 - 2. Submittals.
 - 3. Contractor quality control.
 - 4. Coordination Drawings.
 - 5. Project coordination.
- B. Procedures for preparation, updating and submittal of Construction Progress Documentation.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- Section 00220 Contractor's Bid Submittal Checklist
- Section 01110 Summary of Work Single Contract
- Section 01130 General Construction Requirements
- Section 01300 Project Meetings.
- Section 01320 Construction Progress Documentation
- Section 01330 Submittal Procedures
- Section 01370 Schedule of Values
- Section 01770 Closeout Procedures
- Section 01780 Closeout Submittals

1.03 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. Project Coordination Administrator: Contractor Representative experienced in administration, supervision, and quality control of building expansion and alteration construction, similar to Work of this Project, including mechanical and electrical work.
- B. Project Field Superintendent:
 - 1. Contractor Representative experienced in general field supervision of building construction, similar to Work of this Project, including mechanical and electrical work, to supervise, direct, inspect and coordinate Work of Contractor, subcontractors, suppliers and installers, and expedite Work to assure compliance with Construction Schedules.
 - 2. Superintendent must read, write, and speak English fluently.
 - 3. Superintendent must be present at the Project site whenever work is being performed. Superintendent must remain on the Project from Notice to Proceed to Substantial Completion. Do not change personnel without written permission from the Owner.

1.04 <u>SUBMITTALS</u>

- A. Submit list of Contractor's principal staff assignments, including Project Coordination Administrator, Project Field Superintendent, Quality Control Representative, and other personnel in attendance at site; identify their duties and responsibilities.
- B. Submit all items for execution of Contract as listed in Section 00220 Contractor's Bid Submittal checklist.
- C. Submit shop drawings, product data, and other required submittals, in accordance with Section 01330 -Submittal Procedures, for review and compliance with Contract Documents, for field dimensions and clearances, for relation to available space, and for relation to Work by Owner or separate Contracts.

D. Submit Requests for Information and interpretation of Contract Documents in a timely manner and obtain replies from Architect in accordance with the Contract.

1.05 CONTRACTOR QUALITY CONTROL

- A. Perform project quality control in accordance with requirements in the Contract.
- B. Coordinate scheduling of inspection and testing required by individual specification Sections and in accordance with Section 01400 Quality Control.

1.06 COORDINATION DRAWINGS

A. Prepare and distribute coordination drawings where close coordination is required for installation of Products and materials fabricated off-site by separate entities, and where limited space availability requires maximum utilization of space for efficient installation of different components. Show interrelationship of components shown on separate shop drawings. Indicate required installation sequences.

1.07 PROJECT COORDINATION

- A. Coordinate construction activities and work of all trades under various Sections of these Specifications and Work of Contract to facilitate orderly installation of each part of Work. Coordinate construction operations included under different Sections of Specifications and Contract that are dependent upon each other for proper installation, connection, and operation.
- B. Where installation of one part of Work is dependent on installation of other components, either before or after that part of Work, schedule construction activities in sequence required to obtain uninterrupted installation.
- C. Obtain drawings, manufacturer's product data, instructions, and other data to provide a complete and proper installation.
 - 1. Check field dimensions prior to installing products.
 - Verify necessary clearances and means of access from equipment storage to final position.
 - 2. Make data and information available to trades involved.
- D. Ensure that utility requirements of operating equipment are compatible with building utilities. Coordinate Work of various specification Sections for installation and final connection of equipment.
 - 1. Assure that mechanical, plumbing, and electrical rough-ins have been properly located.
- E. Coordinate space requirements and installation of mechanical, plumbing, and electrical Work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, conduits, and wiring, as closely as possible; make runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- F. Where availability of space is limited, coordinate installation of different components to ensure maximum accessibility for required maintenance, service, and repair.
- G. Provide for installation of items scheduled for future installation.
- H. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Prepare memoranda for Architect and separate contractors where coordination of their work is required.
- I. In finished areas, conceal pipes, ducts, conduits, and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

- J. Coordinate completion and clean up of Work of separate Sections in preparation for completion of work per the Contract.
- K. After Owner occupancy of Project, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize to Owner.

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Construction Progress Schedule.
 - 2. Contractor as-built drawings.
 - 3. Provisions for format, content, revisions, submittals and distribution.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 01300 - Project Meetings.

Section 01330 - Submittal Procedures.

Section 01370 - Schedule of Values.

Section 01770 - Closeout Procedures.

Section 01780 - Closeout Submittals.

1.03 CONSTRUCTION PROGRESS SCHEDULE

- A. Format:
 - 1. Prepare Schedules as horizontal bar chart with separate bar for each major portion of Work or operation, identifying first work day of each week.
 - 2. Sequence of Listings: The Table of Contents of this Project Manual.
 - 3. Form: Contractor's option.
- B. Content:
 - 1. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
 - 2. Identify each item by major Specification section number.
 - 3. Provide sub-schedules to define critical portions of entire Schedule.
 - 4. Show accumulated percentage of completion of each item, and total percentage of Work completed, to correspond with Application for Payment. Percentage of completion shall not include stored materials.
 - 5. Provide separate schedule of submittal dates for shop drawings, product data, and samples and dates reviewed submittals will be required from Architect. Show dates for selection of finishes.
 - 6. Show delivery dates for Owner furnished items, if any.
 - 7. Coordinate content with Section 01370 Schedule of Values.
- C. Revisions:
 - 1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
 - 2. Identify activities modified since previous submittal, major changes in scope and other identifiable changes.
 - 3. Provide narrative report to define problem areas, anticipated delays and impact on Schedule. Report corrective action taken or proposed and its effect.
- D. Submittals:
 - 1. Submit initial Schedules immediately following Award of Contract.
 - After review, revise data and immediately submit for re-review.
 - 2. Submit up-dated Progress Schedules with each Application and Certificate for Payment.
 - 3. An updated Progress Schedule is required for review/consideration for Application and Certificate for Payment.
 - 4. Submit under transmittal letter.

E. Distribution:

- 1. Distribute copies of reviewed schedules to Architect job site file, subcontractors, suppliers and other concerned entities including separate contractors.
- 2. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in Schedules.

1.04 CONTRACTOR AS-BUILT DRAWINGS

A. Format:

- 1. Contractor's job superintendent to record as-built conditions onto a single set of project drawings for all trades included in scope of work.
- 2. As-built set to be kept on site at all times.
- 3. Documentation may be hand written in ink or pasted directly onto drawings. All information must be considered to be permanently affixed.

B. Content:

- 1. Include work of all trades included in scope of work.
- 2. Include all changes, errors, deviations, omissions, additions, clarifications and corrections.
- 3. Include any item installed in a location other than that shown on contract drawings.
- 4. Correct any inaccurate or altered dimension.

C. Revisions:

- 1. As-built drawings shall be updated daily with all work completed.
- 2. Contractor job superintendent to be responsible for subcontractor information on as-built drawings.

D. Submittals:

1. As-built drawings may be reviewed at progress meetings or periodically as requested by Architect to review entries to date.

E. Distribution:

- 1. As built drawings shall be given to Architect prior to release of final payment.
- 2. Refer to Section 01780 Closeout Submittals.

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Submittal Schedule.
 - 2. Submittal Requirements.
 - 3. Shop Drawings.
 - 4. Electronic files provided by the Architect.
 - 5. Product Data.
 - 6. Samples.
 - 7. Manufacturer's Information.
 - 8. Review by Contractor and Architect.
 - 9. Re-submittals.
 - 10. Distribution.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 01370 - Schedule of Values Section 01630 - Product Options and Substitutions Section 01770 - Closeout Procedures Section 01780 - Closeout Submittals

1.03 SUBMITTAL SCHEDULE

- A. Submit to the Architect a schedule listing all submittals required for review as required in the individual specifications sections.
- B. List submittals by specification section as listed in the index.

1.04 SUBMITTAL REQUIREMENTS

A. Formats:

- 1. Submit all drawings and technical data electronically in PDF format.
 - a. Furnish all submittals specified in all sections of the specifications.
 - b. Submit each section under a separate transmittal for clarity and ease of review.
 - c. Make a complete submittal for each section; do not issue multiple submittals per section.
 - d. Compile all sheets, drawings, and product data into a single electronic file for review. Do not submit multiple PDF files per sheet or item.
 - e. Identify manufacturer and subcontractor/supplier.
 - f. Submit Material and Safety Data Sheets for all products and materials.
 - g. Name each PDF file to match specifications title and number,
 - matching that as listed in the project manual.
- 2. Submit to Architect via Architect's project management website specific to this project.
- 3. Submit actual samples for finishes, colors, and textures for approval via mail or hand delivery.
- B. Transmit submittals in accordance with approved Progress Schedule and in such sequence to avoid delay in the Work or work of other contracts.
- C. Apply Contractor's stamp, signed or initialed, certifying to review, verification of products, field dimensions and field construction criteria and coordination of information with requirements of Work and Contract Documents.
- D. Coordinate submittals into logical groupings to facilitate interrelation of the several items:

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- 1. Finishes which involve Architect selections of colors, textures, or patterns.
- 2. Associated items which require correlation for efficient function or for installation.

1.05 <u>SHOP DRAWINGS</u>

A. Present in a clear thorough manner, drawn by professional draftsman.

- B. Identify project with title as shown on cover of Project Manual; identify each element of drawings by reference to sheet number and detail, schedule, or room number on Contract Documents.
- C. Identify field dimensions; show relation to adjacent or critical features of Work or products.

D. Sheet Size:

- 1. Minimum: 8-1/2 x 11 inches.
- 2. Maximum: 30 x 42 inches.

1.06 ELECTRONIC FILES PROVIDED BY THE ARCHITECT

- A. Architect may make available, at no cost, base xref drawings in AutoCAD format for contractor's use in preparing shop drawings.
- B. AutoCAD version of electronic files will be the latest version being utilized in the Architect's office. The Architect has no obligation to provide electronic files in a format that may be an old, outdated, reduced or simplified version of that being utilized in the Architect's office.
- C. Electronic files are an instrument of the Architect's service, and are the property of the Architect.
- D. The use of the information contained in the electronic files is at the sole risk of the user.
- E. The use of the electronic files does not relinquish the contractor from responsibilities for site and field verification of spaces, construction, conditions, requirements, dimensions, etc.

1.07 PRODUCT DATA

- A. Submit only pages which are pertinent; mark each copy of standard printed data to identify pertinent products, referenced to Specification Section and Article number. Show reference standards, performance characteristics, and capacities; wiring and piping diagrams and controls; component parts; finishes; dimensions; and required clearances.
- B. Modify manufacturer's standard schematic drawings and diagrams to supplement standard information and to provide information specifically applicable to the Work. Delete information not applicable.
- C. Provide manufacturer's published catalog pages and industry cutsheets, with all items and options marked as appropriate to the project.

1.08 SAMPLES

- A. When finishes are specified on the Drawings, submit samples of the specified finish for approval.
- B. When finishes are not specified on the Drawings, submit full range of manufacturer's standard finishes, except when more restrictive requirements or price groups are specified, indicating colors, textures, and patterns, for Architect's selection.
- C. Submit samples to illustrate functional characteristics of products, including parts and attachments.
- D. Label each sample with identification required for transmittal letter.

- E. Submit number of samples specified in individual specifications sections but not less than three (3).
- F. Special circumstances may require additional samples for determination of acceptance, such as textures, patterns, colorways, etc. Provide sample in the quantity and/or size as required for this determination.

Requirements to be determined solely by the Architect.

All such samples will be returned to the Contractor, less those retained for Owner and Architect files.

- G. Samples for selection of finishes need to be submitted as actual samples of the actual colors, materials and textures for proper selection and review of available choices. Samples for finishes already selected as indicated in the Drawings may be color charts in lieu of actual samples, if acceptable to the Architect.
- H. All samples may be retained for Owner and Architect files.
- I. See individual Specification sections for additional information and requirements.

1.09 MANUFACTURER'S INFORMATION

- A. Manufacturer's instructions for storage, protection, preparation, assembly, installation, adjusting, balancing and finishing.
- B. Installation details, anchoring requirements or other information specifically required by manufacturer.
- C. Specific information or details required by Manufacturer to uphold warranty of product specified.

1.10 CONTRACTOR'S REVIEW

- A. Review submittals prior to transmittal; verify subcontractor's field measurements, field construction criteria, manufacturer's catalog numbers, and conformance of submittal with requirements of Contract Documents.
- B. Coordinate submittals with requirements of Work and of Contract Documents.
- C. Affix a stamp and sign each drawing, manufacturer's data, sample, etc. as follows:

This submittal has been reviewed by (Name of
Contractor) and approved with respect to the means,
methods, techniques, sequences, and procedures of
construction, and safety precautions and programs
incidental thereto. (Name of Contractor) also warrants
that this submittal complies with contract documents and
comprises no variations or increase in contract price
thereto.
By:
Date:

D. Notify Architect in writing at time of submittal, of any deviations from requirements of Contract Documents. Architect will neither accept incomplete submittals, nor those which in the Architect's opinion, have not been properly reviewed by the Contractor.

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- E. Do not fabricate products or begin work which requires submittals until return of submittal with Architect acceptance.
- F. Submittals which have not been thoroughly reviewed by Contractor prior to being forwarded to Architect will be rejected and returned for review.

1.11 ARCHITECT'S REVIEW

- A. Architect will review shop drawings, product data, and samples and return submittals within a reasonable time frame for complete review and approval.
- B. Architect's review is for conformance with information given and design concept expressed in the Contract Documents. The review shall not constitute approval of safety precautions, or of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.
- C. Review of shop drawings does not authorize changes to the contract sum unless stated in a separate letter or change order.

1.12 <u>RE-SUBMITTALS</u>

A. Make re-submittals under procedures specified for initial submittals; identify changes made since previous submittals.

1.13 <u>DISTRIBUTION</u>

A. Duplicate and distribute reproductions of shop drawings, copies of product data, and samples, which bear Architect's stamp of approval, to job site file, Contractor's Record Documents file, sub-contractors, suppliers and other entities requiring information.

SECTION 01350 - PROJECT SECURITY (Alternate No. 5)

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Armed Guard Security services for the project site and improvements during the construction period to prevent theft and vandalism.
- 1.02 <u>RELATED REQUIREMENTS SPECIFIED ELSEWHERE</u> Section 01110 - Summary of Work - Single Contract Section 01116 - General Construction Requirements

1.03 REQUIREMENTS

- A. Security guard must be present from end of work day to beginning of work day the following morning Monday thru Friday and 24 hours on weekends, holidays and all periods of no construction activity.
- B. Radio or telephone communication capability to local law enforcement and emergency services.
- C. Maintain visitor log for all persons entering the site during guard=s duty. Log requirements:
 - 1. Name
 - 2. Address
 - 3. Drivers License Number
 - 4. Vehicle Description
 - 5. Vehicle License Number
- D. Contractor to include all costs for Security Guard in Base Bid of Contract.

SECTION 01370 - SCHEDULE OF VALUES

1.01 <u>REQUIREMENTS INCLUDES</u>

A. Section Includes:

- 1. General Requirements.
- 2. Format and Content.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 00220 - Contractor's Bid Submittal Checklist.

Section 01210 - Cash Allowances.

Section 01220 - Contingency Allowance.

Section 01310 - Project Management and Coordination.

1.03 <u>GENERAL REQUIREMENTS</u>

- A. Submit to the Architect/Engineer a Schedule of Values allocated to the various portions of the Work.
- B. Upon request of the Architect/Engineer, support the values with data which will substantiate their correctness.
- C. The Schedule of Values, unless objected to by the Architect/Engineer, shall be used as the basis for the Contractor's Application and Certificate for Payment.

1.04 FORMAT AND CONTENT

- A. Type schedule on AIA Document G703, Continuation Sheet for Application and Certificate for Payment. Identify schedule with:
 - 1. Title of Project as listed on cover of Project Manual
 - 2. Architect project number.
 - 3. Name and Address of Contractor.
 - 4. Contract Designation.
 - 5. Date of submission.
- B. Schedule shall list the installed value of the component parts of the Work in sufficient detail, as determined by the Architect, to serve as a basis for computing values for progress payments during construction.
 - 1. Follow the table of contents of this Project manual as the format for listing component items.
 - 2. Identify each line item with the number and title of the respective major section of the specifications.
 - 3. Identify separate line items for all items for materials and labor.
 - 4. Identify further breakdown for any and all items as determined by the Architect.
- C. For Mechanical and Electrical Scope of Work, major products or operations are to be listed.
- D. For the various portions of the work:
 - 1. Each item shall include a directly proportional amount of the contractor overhead and profit.
 - 2. For items on which progress payments will be requested for stored materials, break down the value into:
 - a. The cost of the materials, delivered and unloaded, with taxes paid.
 - b. The total installed value.
- E. The sum of all values listed in the schedule shall equal the total Contract Sum.

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. General Requirements.
 - 2. Qualifications.
 - 3. Laboratory Requirements.
 - 4. Building Survey.
 - 5. Quality Control Procedures.
 - 6. Testing and Inspection Laboratory Services.
 - 7. Contractor Field Inspection and Testing.
 - 8. Contractor's Daily Report.
 - 9. Contractor's Test and Inspection Reports.
 - 10. Non-Compliance Check-Off List.
 - 11. Completion and Inspection of Work.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

- A. General Conditions: Inspections and testing required by laws, ordinances, rules, regulations or orders of public authorities
- B. Certification of products: Respective Specification sections.
- C. Test, adjust and balance of equipment: Respective specification sections.
- D. Inspection, Sampling and Testing of Projects: Respective Specifications sections for item required.
- E. Division 15.
- F. Division 16

1.03 <u>GENERAL REQUIREMENTS</u>

A. Survey:

- 1. Engage licensed surveyor, without extra cost to the Owner.
- 2. Assure correct position of building on site, establish correct levels, lines and grades, verify column centers, walls, trenches, establish grades and bench marks at all grading and drainage improvements, and otherwise fully and completely layout work required by this Contract.

Division 2.

Division 3.

Division 4.

Division 5.

Division 5.

- B. Inspection, Sampling, and Testing is required for:
 - 1. Soils Compaction Control:
 - 2. Cast-In-Place Concrete:
 - 3. Mortar, Grout and CMU Units:
 - 4. Anchor Bolt Torque:
 - 5. Structural Steel Connections:
 - 6. Fully Adhered Roof Membrane: Division 7.
 - 7. Mechanical testing: Division 15.
 - 8. Electrical testing: Division 16.
- C. Employment of Testing Laboratory or Inspector shall in no way relieve Contractor of his obligation to perform Work in accordance with Contract and Contract Documents.

1.04 QUALIFICATIONS

- A. Testing laboratory's qualifications:
 - 1. Testing laboratory should be pre-qualified prior to bidding.
 - 2. Testing laboratory must have a registered professional engineer as full time staff.
 - 3. Testing laboratories wishing to be included on the pre-qualified list herein shall submit qualifications in writing to the Architect no later than ten (10) days prior to the bid.

- B. Pre-qualified testing laboratories:
 - GEM Engineering, Inc.
 2219 Plantside Drive; Louisville, KY 40299 502-493-7100; 502-493-8190 fax
 - Alt & Witzig Engineering, Inc.
 4105 West 99th Street; Carmel, IN 46032 317-875-7000; 317-876-3705 fax
 - Hagerty Engineering, Inc.
 335 Spring Street B; Jeffersonville, IN 47130 505.553.3211
 - Asher Engineering, Inc.
 1021 South Floyd Street; Louisville, KY 40203 502-589-0073; 502-589-0076 fax
 - 5. Qore, Inc. 13005 Middletown Industrial Blvd.; Louisville, KY 40223 502-244-3848; 502-244-3580 fax
 - ATC Group Services / Cardno ATC 11001 Bluegrass Parkway, Suite 250; Louisville, KY 40299 502-710-0264; 502-267-4072 fax

1.05 LABORATORY REQUIREMENTS

- A. Meet basic requirements of ASTM E 329 for inspection and testing agencies for concrete and steel as used in construction.
- B. Perform specified inspections, sampling and testing of materials and methods of construction:
 - 1. Comply with specified standards; ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance with requirements of Contract Documents.
- C. Promptly notify Architect/Engineer and Contractor of irregularities or deficiencies of Work which are observed during performance of services.
- D. Promptly submit two (2) copies of all reports, inspections and tests to Architect, to include the following:
 - 1. Date, project title and number.
 - 2. Testing Laboratory name and address.
 - 3. Name and signature of inspector.
 - 4. Dates of inspection, sampling, and test.
 - 5. Record of temperature and weather.
 - 6. Identification of product and specification section.
 - 7. Location in project.
 - 8. Type of inspection or test.
 - 9. Observations regarding compliance with Contract Documents.

1.06 BUILDING SURVEY

Α.

- Horizontal Control Survey:
 - 1. After earthwork is completed and before any foundation excavation commences, Contractor shall run and maintain a closed, offset traverse outside the building perimeter a suitable distance with 2" x 2" hub stakes driven flush and bearing a Surveyor's tack at all intervening building grids.
 - a. Each hub shall be flagged, protected, and identified by a clearly visible guard stake.
 - b. Appropriate temperature, and sag corrections must be applied if traverse is measured by Surveyor's chain.

- 2. If transit visibility between opposing hubs straddling the building is impossible, additional lines of hubs tacked, flagged, protected, and identified as above) shall be installed along lines through the building and tied into the perimeter traverse.
- 3. The completed traverse (if not run by) shall be checked, drawn up and certified by a Licensed Surveyor employed by the Contractor and approved by the Architect.
 - a. An experience record and professional references shall be submitted along with a request for the approval of any Surveyor.
 - b. One copy of the certified drawing shall be posted in the Contractor's field office for reference.
 - c. Additional copies of the drawing shall be posted in the Contractor's field office for reference.
 - d. Until such time as all foundation; reinforced concrete piers and columns; and steel column anchor bolts are in place, all stakes will be maintained.
 - e. The services of the approved Surveyor shall be secured by the Contractor to re-establish all hubs damaged or lost for any reason.
- 4. All foundations; concrete column dowels and forms; and steel column anchor bolts shall be located by transits set up only over traverse hub stakes.
 - a. Anchor bolts shall be secured in final position by fixing into wood templates, or other approved methods before any concrete is cast.
 - b. The Architect reserves the right to reject the equipment or the personnel.
- B. Vertical Control:
 - 1. After earthwork is completed, the Contractor shall establish building bench marks of 2" Ø i.d. Galvanized Pipe driven a minimum of 4'-0" into ground and having tops level with finished ground floor.
 - a. Sufficient bench marks shall be installed for each ground floor level so that no level shot will exceed 200 feet.
 - b. Level circuits will begin at and close to bench marks referenced on the site plans.
 - 2. The approved Licensed Surveyor shall include in his certification that he has checked (or set) all herein required bench marks.

1.07 QUALITY CONTROL PROCEDURES

- A. Monitor quality control over Contractor staff, subcontractors, suppliers, manufacturer's, products, services, site conditions, and workmanship.
- B. Comply fully with manufacturer's published instructions, including each step in sequence of installation.
- C. Should manufacturer's published instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as a minimum quality for Work, except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons who are thoroughly qualified and trained in their respective trade, to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.
- G. Perform tests required by governing authorities having jurisdiction and utilities having jurisdiction.

1.08 TESTING AND INSPECTION LABORATORY SERVICES

- A. Selection and Payment:
 - 1. Employment and payment for services of an Independent Testing and Inspection Laboratory to perform specified testing and inspection, by Contractor.
 - 2. Employment of Independent Testing and Inspection Laboratory in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents
- B. Quality Assurance:
 - 1. Comply with requirements of ASTM C 802, ASTM C 1077, ASTM C 1093, ASTM D 290, ASTM D 3740, ASTM D 4561, ASTM E 329, ASTM E 543, ASTM E 548, and ASTM E 699.
 - 2. Laboratory: Authorized to operate in State in which Project is located.
 - 3. Laboratory Staff: Maintain a full time registered engineer on staff to review services.
 - 4. Testing Equipment: Calibrated at reasonable intervals with devices of and accuracy traceable to either National Bureau of Standards or accepted values of natural physical constraints.
- C. Laboratory Responsibilities:
 - 1. Contractor should ensure the Laboratory has the following responsibilities and limits on authority (See D).
 - 2. Test samples of mixes submitted by Contractor.
 - 3. Provide qualified personnel at Project site. Cooperate with Architect and Contractor in performance of services.
 - 4. Perform specified sampling, testing, and inspection of Products in accordance with specified standards.
 - 5. Determine compliance of materials and mixes with requirements of Contract Documents.
 - 6. Promptly notify Contractor Quality Control Representative and Architect of observed irregularities or non-conformance of Work or Products.
 - 7. Perform additional tests as required by Architect.
 - 8. Attend appropriate preconstruction meetings and progress meetings.
- D. Limits on Authority:
 - 1. Laboratory may not release, revoke, alter, or expand on requirements of Contract Documents.
 - 2. Laboratory may not approve or accept any portion of Work.
 - 3. Laboratory may not assume any duties of Contractors.
 - 4. Laboratory has no authority to stop Work.

1.09 CONTRACTOR FIELD INSPECTION AND TESTING

A. Contractor:

Test and Inspect Work provided under this Contract to ensure Work is in compliance with Contract requirements. Required tests and inspections are indicated in each individual Specification Section.

B. Preparatory Inspection:

Performed prior to beginning Work and prior to beginning each segment of Work and includes:

- 1. Review of Contract requirements.
- 2. Review of shop drawings and other submittal data after return and approval.
- 3. Examination to assure materials and equipment conform to Contract requirements.
- 4. Examination to assure required preliminary or preparatory Work is complete.
- C. Initial Inspection:

Performed when representative portion of each segment of Work is completed and includes:

- 1. Performance of required tests.
- 2. Quality of workmanship.
- 3. Review for omissions or dimensional errors.

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- 4. Examination of products used, connections and supports.
- 5. Approval or rejection of inspected segment of Work.
- D. Follow-Up Inspections: Performed daily, and more frequently as necessary, to assure non-complying Work has been corrected.
- E. Testing and Inspection: Perform testing and inspection in accordance with requirements in individual Sections.

1.10 CONTRACTOR'S DAILY REPORT

- A. Submit daily report to Architect, for days that work was performed. Include the following information:
 - 1. Contractor name and address.
 - 2. Job reference and information.
 - 3. Date, weather, minimum and maximum temperatures, rainfall, and other pertinent weather occurrences.
 - 4. Daily workforce of Contractor and subcontractors, by trades.
 - 5. Description of work started, ongoing work, and work completed by each subcontractor.
 - 6. Coordination implemented between various trades.
 - 7. Approval of substrates received from various trades.
 - 8. Nonconforming and unsatisfactory items to be corrected.
 - 9. Remarks.
 - 10. Reports may be faxes to Architect no more than one week's worth of reports at one time. Submit daily if requested by Architect.

1.11 CONTRACTOR'S TEST AND INSPECTION REPORTS

- A. Prepare and submit, to Architect, a written report of each test or inspection signed by Contractor Quality Control Representative performing inspection within two (2) days following day inspection was made.
- B. Include the following on written reports of inspection:
 - 1. Cover sheet prominently identifying that inspection "CONFORMS" or "DOES NOT CONFORM" to Contract Documents.
 - 2. Date of inspection and date of report.
 - 3. Project name, location, solicitation number, and Contractor.
 - 4. Names and titles of individuals making inspection, if not Contractor's Project Field Superintendent.
 - 5. Description of Contract requirements for inspection by referencing Specification Section.
 - 6. Description of inspection made, interpretation of inspection results, and notification of significant conditions at time of inspection.
 - 7. Requirements for follow-up inspections.

1.12 NON-COMPLIANCE CHECK-OFF LIST

A. Maintain check-off list of Work that does not comply with Contract Documents, stating specifically what non-complying, date faulty Work was originally discovered, and date Work was corrected. No requirement to report deficiencies corrected same day it was discovered. Submit copy of Non-Compliance Check-Off List of non-complying work items to Architect on a weekly basis.

1.13 COMPLETION AND INSPECTION OF WORK

A. Prior to final acceptance by Architect, submit a certification signed by Contractor to Architect stating that all Work has been inspected and all Work, except as specifically noted, is complete and in compliance with Contract Documents.

B. Record Documents:

- 1. By Contractor Quality Control Representative. Ensure that "As-Builts" required are marked to show any deviations which have been made during the course of construction and are kept current on a daily basis. Upon completion of the Work, certify the accuracy of the "As-Builts" and submit to Architect.
- 2. Refer to Section 01320 Construction Progress Documentation.
- 3. Refer to Section 01780 Closeout Submittals.

SECTION 01411 - SPECIAL INSPECTIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section specifies administrative and procedural requirements for special structural tests and special inspections.
- B. The services include inspections and tests and related actions including reports performed by independent agencies. They do not include Contract enforcement activities performed by Architect.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to production of standard products.
 - 1. Specific structural tests and special inspection requirements for individual construction activities are specified on the design drawings. Those requirements, including inspections and tests, cover production of standard products as well as customized fabrication and installation procedures.
 - 2. Inspections, tests and related actions specified are not intended to limit Contractor's quality control procedures that facilitate compliance with Contract Document requirements.

1.03 RESPONSIBILITIES

- A. Owner Responsibilities: Owner shall bear the costs of the special structural tests and special inspections.
- B. Retesting: Contractor is responsible for the costs of retesting where results of required inspections, tests or similar services prove unsatisfactory construction and indicate non-compliance with Contract Document requirements.
- C. Associated Services: Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
 - 1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
 - 2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
 - 3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
 - 4. Security and protection of samples and test equipment at the Project site.
- D. Duties of Testing Agency: The independent testing agency engaged to perform inspections, sampling and testing of materials and construction specified in the Contract Documents shall cooperate with the Architect and Contractor in performance of its duties, and shall provide qualified personnel to perform required inspections and tests.

- Discrepancies shall be brought to the immediate attention of the Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and to the licensed design professional in responsible charge prior to the completion of that phase of the work. A final report of inspections documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted and signed off by a PE licensed in the State of Kentucky.
- 2. Agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.
- 3. Agency shall not perform any duties of the Contractor.
- E. Coordination: Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition, Contractor and each agency shall coordinate activities to avoid necessity of removing and replacing construction to accommodate inspections and tests.
 - 1. Contractor is responsible for scheduling times for inspections, tests, and similar activities.

1.04 <u>SUBMITTALS</u>

- A. The independent testing agency shall submit a certified written report of each inspection, test or similar service to Architect, Engineer-of-Record and Owner within 3 days of service.
 - 1. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
 - 2. Report Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
 - a. Date of issue.
 - b. Project title and number.
 - c. Name, address and telephone number of inspection/testing agency.
 - d. Dates and locations of samples and tests or inspections.
 - e. Names of individuals making the inspection or test.
 - 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 an interpretation of test results.
 - j. Ambient conditions at the time of sample-taking and testing.
 - k. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
 - I. Name and signature of inspector.
 - m. Recommendations on retesting.
 - 3. Final Report of Inspections: Testing Agency is to provide a final letter/report to the Owner & Architect for submission to the Kentucky Department of Housing, Buildings and Construction stating that the building's compliance with code required and specified Special Inspections at the conclusion of the project.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

- 3.01 ACCEPTABLE TESTING AGENCIES
 - A. Qualification for Service Agencies: Inspection and testing service agencies, including independent testing laboratories, shall comply with "Recommended Requirements for Independent Laboratory Qualification" by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

- 1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the State in which the Project is located.
- 2. The individual performing the inspections and/or testing shall have a minimum of 5 years experience in the related activity.
- 3. Two weeks prior to start of services, the service agency shall submit qualifications of individuals who will be performing the required tasks.
- 4. A Professional Engineer employed by the testing agency and licensed in Kentucky shall be in responsible charge of all testing activities.

3.2 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample-taking and similar services, Contractor shall repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Division 01 Section "Cutting and Patching".
- B. Protect construction exposed by or for structural test and special inspection service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of assignment of responsibility for inspection, testing or similar services.

SECTION 01420 - REFERENCES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Specification format and content.
 - 2. Quality assurance.
 - 3. Reference standards.
 - 4. Abbreviations.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

The Contract Documents, apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.

1.03 SPECIFICATION FORMAT AND CONTENT

A. Specification Format:

Specifications are organized into Divisions and Sections based on Construction Specifications Institute (CSI) 16-Division format and Master Format numbering system.

Specific projects may also include an added Division 17-Technology and Communications.

B. Specification Content:

This Specification uses certain conventions in use of language and intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

1. Abbreviated Language:

Language used in Specifications and other Contract Documents is abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and context of Contract Documents so indicates.

- 2. Imperative and streamlined language is used generally in Specifications. Requirements expressed in imperative mood are to be performed by Contractor. At certain locations in text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by Contractor, or by others when so noted.
- 3. The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.04 QUALITY ASSURANCE

- A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes. Such standards are made a part of Contract Documents by reference.
- B. Conform to reference standard by date of issue current on original date of issue indicated on Contract Documents.
- C. Obtain copies of standards when required by Contract Documents.
- D. Maintain copy at Project Site during submittals, planning, and progress of specific Work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.

REFERENCES

F. The contractual relationship, duties, and responsibilities of the parties in Contract nor those of Architect shall not be altered from Contract Documents by mention or inference otherwise in any reference document.

1.05 <u>REFERENCE STANDARDS</u>

A. Conflicting Requirements:

Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels. Refer requirements that are different, but apparently equal, and uncertainties to Architect for decision before proceeding.

1. Minimum Quantity or Quality Levels:

Quantity or quality level shown or specified shall be the minimum provided or performed. Actual installation may comply exactly with minimum quantity or quality specified, or it may exceed minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for context of requirements. Refer uncertainties to Architect for decision before proceeding.

B. Copies of Standards:

Each entity engaged in construction on Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents.

1. Where copies of standards are needed for performance of a required construction activity, Contractor shall obtain copies directly from publication source.

1.06 <u>ABBREVIATIONS</u>

A. Abbreviations and Names:

Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in Specifications or other Contract Documents, they mean the recognized name of trade association, standards generating organization, authority having jurisdiction, or other entity applicable to context of text provision. Refer to "Encyclopedia of Associations," published by Gale Research Company, available in most libraries.

SECTION 01510 - TEMPORARY UTILITIES

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Responsibility of Owner and Contractor.
 - 2. Provisions for temporary electrical power.
 - 3. Provisions for temporary lighting.
 - 4. Provisions for temporary heating and ventilation
 - 5. Provisions for temporary water.
 - 6. Provisions for temporary telephone, fax and internet.
 - 7. Regulatory Agency Requirements.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 00700 - General Conditions. Section 00810 - Supplementary General Conditions. Section 01110 - Summary of Work - Single Contract. Section 01130 - General Construction Requirements.

1.03 <u>RESPONSIBILITY</u>

- A. Responsibility of Owner:
 - 1. Owner is not responsible for the establishment or payment of any temporary utilities.
 - 2. Pay all utility bills from the utility companies for Owner's existing established utility services within existing buildings and construction limits for the duration of construction.
 - 3. Owner is not responsible for any costs directly to the contractor for non-established utility items including such items as fuels, tanks, generators, extensions, hookups, feeds, cords, hoses, wiring, etc. as may be required by the contractor for their ability to provide needed temporary utilities specified herein.
 - 4. Owner is not responsible for any Contractor job overhead costs such as cell phones, fax, internet, water hauling, etc. that may be required as part of the construction activities.
- B. Responsibility of Contractor:
 - 1. Pay all utility bills for all new or temporary utility services within construction limits for duration of construction.
 - 2. Coordinate establishment, timing and all requirements of all temporary utilities with all utility companies and authorities having jurisdiction.
 - Coordinate establishment, timing and all requirements of all permanent utilities, including new services and/or reworking of existing services, with all utility companies and authorities having jurisdiction.
 - 4. Provide, install, re-install, remove, coordinate, etc, any and all temporary utilities to all areas of the site and project resulting from any and all phasing of the work.
 - 5. Provide temporary electrical power, as required.
 - 6. Provide temporary lighting, as required.
 - 7. Provide temporary heating and ventilation, as required.
 - 8. Provide temporary water, as required.
 - 9. Provide temporary telephone, fax and internet, as required.
 - 10. Coordinate shut-offs of any and all utilities with Owner at least 24 hours in advance.
 - 11. Each individual Contractor to provide temporary utilities for all contractors, crews and trades under their control or within the scope of work for their contract.

1.04 DESCRIPTION

- A. Temporary Electrical Power:
 - 1. Contractor may need to provide portable electric generators until utility service is available.
 - 2. Provide adequate electrical power centers, wiring and services for all tools, equipment and miscellaneous items.
 - 3. Locate so that power is available at any point with no more than 100 foot extension.
 - 4 If required, provide minimum 200 ampere volt service entrance for voltage required.
 - 5. Provide weather-proof distribution boxes at power centers, minimum four 20-amp 120 volt grounded outlets, with ground fault circuit breaker protection. Additional circuits as required.
 - 6. Provide equipment grounding continuity for entire system.
 - 7. Individual contractors and users provide grounded UL approved extension cords from power center.
 - 8. Contractor to provide power for any and all temporary field offices, architect's field office, storage and construction buildings.
 - 9. Contractor to provide power for temporary lighting, heating, ventilation and air conditioning.
 - 10. Contractor to provide power for pumping, welding and other special equipment or procedures.
 - 11. Provide temporary covers or plates for any and all openings, electrical boxes, receptacles, etc. that may be open during construction or awaiting installation of final covers or plates.
- B. Temporary Lighting:
 - 1. Provide work lighting, safety lighting and security lighting.
 - 2. Provide lighting for construction and storage areas.
 - 3. Provide lighting for Owner's tours or access to site areas for review.
 - 4. Lightings Levels:
 - a. General work lighting and safety lighting 5 foot candles.
 - b. Finishing and detail work 20 foot candles.
 - 5. Periods of Service:
 - a. Work and safety lighting continuous during working hours.
 - b. Security lighting at all hours of darkness.
 - 6. Replace lamps throughout, as required.
 - 7. Provide temporary exit signs as required for phasing of work or relocation of exits and egress paths.
- C. Temporary Heating and Ventilation:
 - 1. Provide as required to protect work and products against dampness and cold.
 - 2. Provide suitable ambient temperatures for installation and curing of materials.
 - 3. Provide adequate ventilation for safe working environment in accord with health regulations.
 - 4. Heat and ventilate temporary field offices and other storage and construction buildings.
 - 5. Temperatures Required:
 - a. Minimum 40°F, 24 hours a day.
 - b. During working hours and 24 hours a day during concrete and masonry work: 50°F.
 - c. During interior finish work, 24 hours a day, 7 days prior to placing finishes until substantial completion: 70°F.
 - 6. Ventilation required to prevent hazardous accumulation and harmful exposure of dusts, fumes, mists, vapors or gases.
 - 7. Ventilation required for curing installed materials, humidity dispersal and sanitary facilities.
 - 8. Gas for temporary heating shall be from portable tanks only, not the use of natural gas system.
 - 9. Building system may be used for temporary heat <u>only</u> with approval of Architect. Areas must be sufficiently cleaned so as not to cause damage to system from construction dust and dirt.
 - 10. New filters are to be installed prior to operation of system.
 - 11. Contractor to replace all filters with new in all temporary and permanently installed units during construction every two (2) weeks minimum, and more frequently during times and in areas of heavy demolition work. Maintain and install additional cloth filters over all return air outlets at all times.
 - 12. New filters must be replaced just prior to owner occupancy.

- D. Temporary Water:
 - 1. Provide service standpipe, centrally located, with minimum of two (2) 3/4" hose bibbs.
 - 2. Discharge pressure: Minimum 20 psi.
 - 3. Individual contractors and users provide hoses from hose bibbs.
 - 4. Maintain adequate water volume for all purposes.
 - 5. Provide water for temporary sanitary facilities, field offices, storage buildings, and cleaning and construction operations.
 - 6. Obtain required certification from authorities.
 - 7. If offsite water is required, Contractor shall pay all costs of water and hauling.
 - 8. Provide temporary caps, valves, shut-offs, and spigots as required.
 - 9. Contractor is to coordinate supply of water to areas of building which are to remain in service.
 - 10. Running of hoses through portions of an existing building is not allowed without approval of Owner.
- E. Temporary Telephone, Fax and Internet:
 - 1. Provide, maintain and pay for telephone and fax service to Contractor's field offices throughout construction.
 - 2. Provide, maintain and pay for telephone and fax service to Architect's field offices throughout construction, if separate offices are required for Architect's use.
 - 3. Contractor's job site superintendent is required to have a cellular/mobile phone at all times during normal working hours.
 - 4. Use of cellular/mobile phones are allowed for temporary phone service, except at field offices.
 - 5. Use of Owner's lines is prohibited; phone, fax, or internet.
 - 6. If contractor desires internet or e-mail service for their use at the jobsite, the contractor shall be responsible to provide it, and shall bear all costs for its installation and use. Use of any Owner's wireless internet service is prohibited, without express permission.

1.05 REGULATORY AGENCY REQUIREMENTS

- A. Obtain and pay for permits as required by authorities.
- B. Obtain and pay for temporary easements as required across property other than Owners.
- C. Comply with applicable Federal, State, and Local Codes:
 - 1. Occupational Safety and Health Act of 1970, as amended.
 - 2. National Electric Code.
 - 3. National Electric Safety Code.
- D. Comply with Utility Regulations.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Materials may be new or used, adequate in capacity for the purpose intended, without creating unsafe conditions or violating codes.
- B. Comply with Electrical Basic Materials and Methods, Division 16:
 - 1. Temporary wiring shall include green equipment grounding conductor and all outlets shall be grounding type.
 - 2. Provide required facilities, including transformers, conductors, poles, conduits, raceways, breakers, fuses and switches.
 - 3. Provide vapor proof and explosion proof fixtures in applicable areas.

- C. Comply with Basic Mechanical Requirements, Division 15:
 - 1. Provide required facilities, including piping, valves, pumps, pressure regulators and tanks.
 - 2. Portable Heaters: Oil or gas fired with electric blower, not requiring vent from heated space.
 - 3. Salamanders shall not be used.

PART 3 - EXECUTION

3.01 <u>GENERAL</u>

- A. Comply with applicable sections of Division 15, Mechanical and Division 16, Electrical.
- B. Install work in neat and orderly manner, structurally sound.
- C. Locate services to avoid interference with traffic, work and storage areas, material handling equipment and cranes.
- D. Modify service as work progress requires.

3.02 INSTALLATION

- A. Electrical:
 - 1. Service and distribution may be overhead or underground.
 - 2. Locate lighting to provide full illumination of required areas.
 - 3. Locate controls at entrance to each area.
 - 4. Install security lighting throughout all areas.
 - 5. Wire temporary heating equipment.
 - 6. Do not run branch circuits on floor.
- B. Heating and Ventilation:
 - 1. Locate to provide equitable distribution as required.
- C. Water:
 - 1. Do not run piping on floor or ground.
 - 2. Locate water outlets to provide service convenient to work.
 - 3. Provide drip pan under hose bibbs within the building, connect to drain.
 - 4. Provide insulation to prevent pipes from freezing.
 - 5. Provide temporary pumps, tanks and compressors as necessary to maintain pressure.

3.03 <u>REMOVAL</u>

- A. Remove completely all temporary materials and equipment upon completion of construction or when no longer required.
- B. Clean and repair damage caused by temporary installation and restore to satisfactory condition per Owner and Architect.
- C. Immediately prior to completion of project, remove temporary lamps and install new lamps throughout.

SECTION 01520 - TEMPORARY CONSTRUCTION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Temporary Structures:
 - a. Contractor's Field Offices.
 - b. Architect's Field Office.
 - c. Storage Trailers.
 - d. Enclosures.
 - e. Toilets.
 - f. Stairs, Ladders, Ramps, etc.
 - g. Temporary Fence.
 - h. Project Signage.
 - i. Construction Road, Parking Facilities.
 - 2. Access Roads and Parking Areas.
 - 3. Installation.
 - 4. Removal and Cleanup.
 - 5. Protection.
 - 6. Temporary Use of Elevator.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 00700 - General Conditions. Section 00810 - Supplementary General Conditions. Section 01110 - Summary of Work – Single Contract. Section 01510 - Temporary Utilities.

PART 2 - PRODUCTS

- 2.01 TEMPORARY STRUCTURES
 - A. Contractor's Field Offices:
 - 1. Provided by General Contractor.
 - 2. The Contractor's offices required for general use and project meetings.
 - 3. Type Option: Portable typical trailer units.
 - 4. Windows, operable, screened; provide view of construction.
 - 5. Automatic heating to maintain min 70°F.
 - 6. Furnish emergency first-aid equipment, ABC fire extinguisher, extra hard hats.
 - 7. Telephones with loud outside gong on Contractor's line.
 - 8. Fax line and fax machine.
 - 9. Furnishings: Provide desk, chairs, adequate drawings reference board, drawing racks, and filing cabinets as needed.
 - 10. Security: Provide window and door locks so that each office can be made independently secure.
 - 11. Thermometer: Install a <u>new</u> bulb type weather thermometer on outside of office, adjacent to window for inside reading. Do not install in direct sunlight.
 - B. Architect's Field Office:
 - 1. Provided by General Contractor, 8'x20' minimum size unit.
 - 2. Provide desk, chair, filing cabinet, folding table for drawing layout, and ample space for drawings and specifications for use by Architect.
 - 3. Provide table and folding chairs sufficient for project meetings.
 - 4. Provide stairs and landing at entry.

- 5. Provide independently secure locking unit with separate key, available only to Architect.
- 6. Furnish emergency first-aid equipment, ABC fire extinguisher, extra hard hats.
- 7. Provide dedicated separate telephone and fax lines for use by Architect.
- 8. Complete set-up at beginning of project and removal at end of project.
- 9. As approved by the Architect, a larger combination unit may be used by both the Contractor and Architect as field offices. Unit must allow for separate lockable offices for each, restroom facility, and ample area for project meetings and storage.
- C. Storage Trailers:
 - 1. Provided by General Contractor or subcontractor as required.
 - 2. Coordinate location with Architect.
 - 3. Remove at project completion and clean up area.
- D. Enclosures:
 - 1. Provided by General Contractor.
 - 2. Provide temporary weather-tight enclosures for all exterior openings.
 - 3. Equip exterior doors with locks and closures.
- E. Toilets:
 - 1. Provided by General Contractor.
 - 2. Provide temporary sanitary facilities during construction period.
 - 3. Enclose toilet facilities for construction personnel.
 - 4. Portable units acceptable. No chemical toilets permitted.
 - 5. Do not use toilets in existing or new building.
- F. Stairs, Ladders, Ramps, etc.:
 - 1. Provided by General Contractor.
 - 2. Provide temporary stairs, ladders, ramps runways, scaffolds, derricks, chutes and similar items required for proper execution of work by the trades.
- G. Temporary Fence:
 - 1. Provided by General Contractor.
 - 2. Chain link fence, 6'-0" high, minimum.
 - Provide fencing located as necessary to enclose the entire project construction limits, prior to work beginning. Provide with gates of sufficient size and quantity. Coordinate all locations and requirements with Architect and Owner's Representative.
 - Routing of fencing shall include all areas the Owner deems necessary to ensure the safety of the inhabitants of the site and the general public, as determined by construction operations on site.
 - 5. Provide separate entrance gates for union and non-union personnel. Gates shall be clearly identified. Locate gates at opposite ends of the project site.
- H. Project Signage:
 - 1. Provided by General Contractor.
 - Provide project identification sign of wood frame and exterior grade medium density overlay plywood construction, painted with lettering by professional sign painter, per Architect's design and colors.
 - List title of project, Owner, Architect and Contractor. See drawings for detail, if applicable.
 - 3. Signage of individual contractors or sub-contractors will be allowed only for identification of temporary offices and off site storage areas.
 - 4. No other signage or advertisement will be allowed on the project site.

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- I. Construction Road, Parking Facilities:
 - 1. Provided by each individual General or Prime Contractor.
 - 2. Crushed Stone, #53 size.

2.02 ACCESS ROADS AND PARKING AREAS

- A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.
- B. Extend and relocate as Work progress requires. Provide detours necessary for unimpeded traffic flow.
- C. Provide and maintain access to fire hydrants, free of obstructions.
- D. Provide means of removing mud from vehicle wheels before entering streets.
- E. Parking: Provide temporary gravel surface parking areas to accommodate construction personnel.
 - 1. When site space is not adequate, provide additional off-site parking.
 - 2. Do not allow vehicle parking on existing pavement.
 - 3. Designate two parking spaces near Architect's field office.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Temporary Structures:
 - 1. Locate as directed to avoid interference with work.
 - 2. Relocate as required and as directed by Architect.
 - 3. Construct with code-approved service connections.
 - 4. Mount fire extinguishers in prominent accessible location.
 - 5. Maintain offices during construction period.
 - 6. Provide wooden steps and landing with handrail.
 - 7. Provide crushed stone walkway.
 - 8. Provide temporary concrete walks and pathways as indicated on temporary exiting plans. Locate, relocate, and coordinate as required to accommodate phasing of work, progress of work, code and fire officials, and concerns of Owner and Architect.
- B. Temporary Enclosures:
 - 1. Erect temporary doors as soon as enclosing walls are up.
 - 2. Cover window or wall openings in advance of finishing operations when temporary heat is required.
 - 3. Replace with permanent closures as soon as possible.
 - 4. Install temporary partitions as required to control dust and moisture penetration into existing and completed spaces.
 - 5. Provide temporary protection for installed products.
 - 6. Provide temporary enclosures and fencing protection as indicated on temporary exiting plans. Locate, relocate, and coordinate as required to accommodate phasing of work, progress of work, code and fire officials, and concerns of Owner and Architect.
- C. Temporary Toilets:
 - 1. Locate as directed in convenient location to avoid interference with project.
 - 2. Anchor portable units to prevent dislocation.
 - 3. Service daily.
 - 4. Relocate as work progresses.
- D. Temporary Road Construction:
 - 1. Locate construction road and parking areas at permanent locations.
 - 2. Incorporate temporary stone roads into final paved areas as base course.
 - 3. Maintain roads during construction period.
 - 4. Inspect and correct base course to specified thickness and level before paving is installed.

- E. Temporary Construction Apparatus:
 - 1. Erect Scaffolding, securely in conformance with labor laws and safety codes.
 - 2. Construct stairs, ladders, ramps, runways and derricks security to sustain 100 psf minimum live load or as required for their use.

3.02 REMOVAL AND CLEAN UP

- A. Remove all temporary structures and materials completely upon completion of construction.
- B. Remove debris and clean area.
- C. Repair all damage and restore to finish condition.

3.03 PROTECTION

- A. Safety:
 - 1. Maintain lights and barricades on all obstruction and hazards during contract period in conformance to federal and local laws and codes.
- B. Fire Protection:
 - 1. Provide multi-purpose dry chemical extinguishers.
 - 2. Locate one extinguisher adjacent to each stairway.
 - 3. Wherever and whenever any burning, welding, cutting or soldering operations are in progress, or equipment is in use, or any work involving a fire hazard is performed, the Contractor or Subcontractor responsible for such operation shall have at all times acceptable fire extinguishes or protection within ten feet of the operation.

C. Piping:

- 1. Keep materials out of piping by capping or other protection.
- 2. Trades responsible for stoppage shall bear expense of cleaning.

D. Equipment:

- 1. Each contractor and subcontractor shall take necessary precautions to protect and secure own equipment, tools and material.
- E. Surface Water Control:
 - 1. Grade site to drain properly at all times, without accumulation of water.
 - 2. Maintain excavations free of water. Pump excavation as required.
 - 3. Protect site from erosion. Do not allow erosion to leave site.

3.04 <u>TEMPORARY USE OF ELEVATOR</u>

- A. Elevator may be used by Contractor for temporary service during construction, after installation and inspection.
- B. Provide and maintain temporary plywood lining and protective padding as required on floors, walls and ceiling of elevator cab.
- C. Clean and Restore:
 - 1. Inspect, clean, and restore to original condition, equal to new, all equipment and accessories.
 - 2. Replace all worn or damaged parts.
 - 3. Cost of temporary operation and repair shall be paid by General Contractor.
- D. Make necessary arrangements with elevator subcontractor for temporary acceptance.

SECTION 01610 - PRODUCT DELIVERY AND HANDLING

PART 1- GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Material shipments and project delivery to job site.
 - 2. Handling of materials and products included in project.
 - 3. Phasing of the work.

1.02 <u>RELATED REQUIREMENTS SPECIFIED ELSEWHERE</u> Section 00700 - General Conditions. Section 00810 - Supplementary General Conditions. Section 01640 - Owner Furnished Equipment.

1.03 <u>DELIVERY</u>

- A. Delivery materials, supplies or equipment to Project site during working hours.
- B. Deliveries made during other than normal working hours must be received by an authorized agent of the Contractor.
- C. No employee of the Owner is authorized to receive any shipment designated for this project.
- D. The Owner assumes no responsibility for receiving any shipments designated for this project.
- E. Under no circumstances may shipments be directed to, or in care of, the Owner.

1.04 HANDLING

A. All materials furnished under this Contract shall be identified, shipped, addressed, consigned, etc., to the Contractor who may be charged therewith by giving the name of the Contractor, the name of the project, the street and the city.

1.05 PHASING OF THE WORK

- A. Work may be phased, limiting installation of materials to separate areas of site or times of construction.
- B. Any and all coordination of materials on site related to phasing of the work shall be accomplished by the Contractor at no additional costs to the Owner.
- C. All materials, equipment, and associated items and components for the scope of work are to be delivered to the site only as and when needed for installation. Time allowed on site prior to installation shall be a reasonable timeframe as deemed acceptable by the Architect.
- D. All items on site shall be stored off the ground and protected by watertight encapsulating cover in preparation for immediate installation.
- E. Any and all items on site in a timeframe deemed unacceptable by the Architect for any reason, or deemed to be damaged by improper handling or storage, are to be removed from the site and returned to the manufacturer, without cost to the Owner. Products shall be replaced entirely with new materials at the time needed and deemed acceptable for installation.

SECTION 01630 - PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1- GENERAL

1.01 REQUIREMENTS INCLUDED

Section Includes:

- 1. Contractor's options.
- 2. Requests for substitutions.
- 1.02 <u>RELATED REQUIREMENTS FOR SUBSITUTIONS SPECIFIED ELSEWHERE</u> Section 01330- Submittal Procedures.
- 1.03 CONTRACTOR'S OPTIONS
 - A. For products specified only by referenced standards, select product meeting standards and submit for approval in accordance with this section.
 - B. For products listing several manufacturers or model numbers, the following criteria apply:
 - 1. For specification sections naming a list of acceptable manufacturers and only one manufacturer's specific model name or number, alternate products from the list of acceptable manufacturers are acceptable only if they are equivalent to the named, specific, model name or number in all respects. If the alternate manufacturer's product is not equivalent to the named, specific, model name or number in all respects, then that manufacturer's product is not an acceptable substitution, even though they are named as an acceptable manufacturer in the specification section. Proposed products from listed alternate manufacturers with no model name or model number listed must be submitted in accordance with this section.
 - 2. For specification sections naming a list of acceptable manufacturers, and no specific model number from any of the listed manufacturers is named in the specification, alternate products from named manufacturers are acceptable provided that they are equivalent to the listed performance criteria and referenced standards in all respects. If the alternate manufacturer's product is not equivalent to the listed performance criteria and referenced standards in all respects, then that manufacturer's product is not an acceptable substitution, even though they are named as an acceptable manufacturer in the specification section.
 - 3. For specification sections naming a list of acceptable manufacturers and a number of manufacturer's specific model numbers, any of the named, specific, referenced products as listed are acceptable. Alternate products from the listed acceptable manufacturers are acceptable only if they are equivalent to at least one of the named, specific, model names or numbers in all respects. If the alternate manufacturer's product is not equivalent to at least one of the named, specific, model names or numbers in all respects. If the alternate or numbers in all respects, then that manufacturer's product is not an acceptable substitution, even though they are named as an acceptable manufacturer in the specification section. Proposed products from listed alternate manufacturers without a listed model name or number must be submitted in accordance with this section.
 - C. For products specified by naming only one product and manufacturer, there is no option, and no substitution will be allowed. This item may have been specified in this manner to standardize the Owner's maintenance procedures or stock inventory, comply with the Owner's warranty requirements, or to maintain compatibility with existing construction. In some instances, this item may have been specified to determine a level of quality or performance desired and requests for substitutions may be accepted for consideration as determined by the Architect.

1.04 REQUESTS FOR SUBSTITUTIONS

- A. During period of bid preparation, Architect will consider written requests for substitutions, received at least ten (10) calendar days prior to bid date; requests received after that time will not be considered.
- B. Products proposed for installation by the Contractor and approved by the Architect shall not be changed except with written consent of the Architect.
- C. Submit all information to the Architect electronically via e-mail or CD, unless otherwise permitted. If hard copies are permitted, submit two (2) copies of all information.
- D. Include the following information in request.
 - Submittals or product catalogs without the following specific information listed will not be considered.
 - 1. Complete data substantiating compliance of proposed substitution with Contract Documents.
 - 2. Product Data:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature;
 - 1) Product description.
 - 2) Performance and test data.
 - 3) Reference standards.
 - 4) Material safety and data sheets.
 - c. Samples.
 - d. Name and address of similar projects which may be visited in vicinity of project on which product was used and date of installation.
 - 3. Construction Method: detailed description and drawings of proposed method.
 - 4. Itemized comparison of proposed substitution with product or method specified.
 - 5. Data relating to changes in construction schedule.
 - 6. Relation to separate contracts.
 - 7. Accurate cost data on proposed substitution in comparison with product or method specified.
 - 8. Literature of item proposing to replace, proving equality and comparison.
- E. In making the request for substitution, Bidder/Contractor represents:
 - 1. They have investigated proposed product or method and determined that it is equal or superior in all respects to that specified.
 - 2. They will provide the same warranty requirements for substitution item as for product or method specified.
 - 3. They will coordinate and accommodate installation of accepted substitution into the work, making such changes as may be required for work to be complete in all respects and trades.
 - 4. The Bidder/Contractor waives all claims for any and all additional costs or time related to this substitution which consequently become apparent, by contractor, subcontractors, vendors, and suppliers. Bidder/Contractor shall be responsible for any and all costs, direct or indirect, resulting from this Request.
 - 5. Cost data is complete and includes all related costs under his Contract, but excludes:
 - a. Costs under separate contracts.
 - b. Architect's redesign costs, if any.
- F. Substitutions will not be considered if (in the opinion of the Architect):
 - 1. Request is not received within the proper timeframe for consideration prior to the bid date.
 - 2. Request does not contain the proper information for determination of substitution.
 - 3. Item has been specified with no substitutions permitted.
 - 4. Item is not considered to be equal to that specified.
 - 5. Item would require substantial revision to the Contract Documents or design intent.

- 6. Item would have an adverse effect on the project or construction schedule.
- 7. Item would have an adverse effect on other trades or scope of work.
- 8. Item is deemed unacceptable by the Owner for any reason.
- 9. Item is deemed not equal to the desired aesthetic or have an adverse aesthetic effect; including colors, textures, patterns or appearance specified or intended.
- 10. They are indicated or implied on shop drawings or project data submittal without formal request submitted in accordance with this Section.
- 11. They have not been included in an addendum during bidding.
- 12. They are made after award of Contract.
- G. It is the responsibility of the bidder to make a complete and proper submission for their request for substitution, to the correct party as indicated in the specifications and within the required timeframe. The Architect is not responsible for any errors in the bidders submission, including such items as sending information to the incorrect contact person, or sending the request to the incorrect mailing address, fax number or e-mail address.
- H. The decision of the Architect is FINAL.

SECTION 01640 - OWNER-FURNISHED EQUIPMENT

1.01 REQUIREMENTS INCLUDED

PART 1 - GENERAL

- A. Section Includes:
 - 1. Description of work.
 - 2. Definitions.
 - 3. Protection and Cleaning.
 - 4. Building Systems.
- 1.02 <u>RELATED REQUIREMENTS SPECIFIED ELSEWHERE</u> Section 01110 - Summary of Work - Single Contract Section 01130 - General Construction Requirements

1.03 DESCRIPTION OF WORK

- A. Coordinate the installation of the equipment or system with all trades. Any problem noted shall be brought to the attention of the Architect. This notification must be submitted in writing and no claims for additional work shall be considered unless the request for clarification has been initiated by the Contractor.
- B. Work includes installation of owner furnished items as noted on drawings and coordination of owner installed items with owner's representatives, and vendors and suppliers.

1.04 DEFINITIONS

- A. OFCI: (Owner Furnished Contractor Installed)
 - 1. The Owner shall be responsible for furnishing equipment or system for installation by Contractor.
 - 2. The Contractor shall be responsible for receiving, storing, protecting, providing all rough-in services, installing and testing of the equipment or system. The Contractor shall receive, inventory, verify quantity and condition and notify the Owner of any discrepancies or damage. The Contractor shall provide coordination, blocking, connections and all provisions necessary to fully incorporate into the project, scope, building and site.
- B. CFCI: (Contractor Furnished Contractor Installed)
 - 1. The Contractor shall be responsible for ordering, receiving, storing, protecting, installing and testing of the equipment or system.
 - 2. Unless otherwise noted, <u>ALL</u> work shown on drawings and specified is C.F.C.I.
- C. OFOI: (Owner Furnished Owner Installed)
 - 1. The Owner shall be responsible for furnishing and installing this equipment or system.
 - 2. The Contractor shall be required to furnish any rough-ins as shown on the Contract Documents, and cooperate with the Owner and their vendors to coordinate this work with work of the Contract.

1.05 PROTECTION & CLEANING

1. Contractor shall protect and clean all O.F.C.I. items, treating them the same as if they had been purchased by the contractor.

1.06 BUILDING SYSTEMS

- A. Voice/Data Network System:
 - 1. Owner's Responsibility:
 - a. Will determine the type of system to be used.
 - b. Furnish and install system equipment complete.
 - c. Provide servers, computers, routers, racks, handsets, switches, etc.
 - d. Provide, install and connect all wire and cable from patch panels to system equipment.
 - 2. Contractor's Responsibility:
 - a. Provide and install all cable tray, conduit, backboxes, junction boxes, backboards, power outlets, outlet devices and plates, patch panels, racks, patch cords, ventilation, sleeves through firewalls and floors and other items or work not specifically indicated.
 - b. Provide, install and connect all wire and cable from ultimate outlet locations to patch panels.
 - c. Complete final connections and testing and certification of those connections between ultimate outlet locations and patch panels.
 - d. See Electrical Drawings and Specifications for additional information and clarification.
- B. Video Presentation and Communication System:
 - 1. Owner's Responsibility:
 - a. Will determine the type of system to be used.
 - b. Furnish and install system equipment complete.
 - c. Provide, install and connect all wire and cable from ultimate outlet location to system equipment.
 - 2. Contractor's Responsibility:
 - a. Provide and install all conduit, backboxes, junction boxes, power outlets, outlet devices and plates, sleeves through firewalls and floors and other items or work not specifically indicated.
 - b. Provide and install wire and cable from patch panel to ultimate outlet location.
 - c. Coordinate with Owner's vendor/installer.
 - d. See Electrical Drawings and Specifications for additional information and clarification.
- C. Building Security System:
 - 1. Owner's Responsibility:
 - a. Will determine the type of system to be used.
 - b. Furnish and install system equipment complete.
 - c. Provide, install and connect all wire and cable complete.
 - 2. Contractor's Responsibility:
 - a. Provide and install all conduit, backboxes, junction boxes, power outlets, outlet devices and plates, sleeves through firewalls and floors and other items or work not specifically indicated.
 - b. Coordinate exact locations of backboxes in walls and ceilings prior to rough-in.
 - c. Coordinate with Owner's vendor/installer.
 - d. See Electrical Drawings and Specifications for additional information and clarification.
- D. Door Access Control System:
 - 1. Owner's Responsibility:
 - a. Will determine the type of system to be used.
 - b. Provide, install and connect all wire and cable to building security system complete.
 - 2. Contractor's Responsibility:
 - a. Provide and install all equipment, door hardware and components as included in bid documents.
 - b. Provide and install all wire and cable and connections between various equipment, door hardware and components and between these components and patch panel as required.
 - c. Provide and install all conduit, backboxes, junction boxes, power outlets, outlet devices and plates, sleeves through firewalls and floors and other items or work not specifically indicated.

- d. Coordinate exact locations of backboxes in walls and ceilings prior to rough-in.
- e. Coordinate with Owner's vendor/installer.
- f. See Electrical Drawings and Specifications for additional information and clarification.
- E. All Other Items Indicated on Drawings as O.F.C.I.
 - 1. Owner's Responsibility:
 - a. Will determine the type system to be used.
 - b. Deliver items to job site.
 - 2. Contractor's Responsibility:
 - a. Provide coordination, blocking and install items.
 - b. Provide any and all connections and provisions necessary to fully incorporate into the project.

SECTION 01732 - CUTTING AND PATCHING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Make several parts fit properly.
 - 2. Uncover work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming with requirements of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Remove existing construction necessary to install new materials, equipment, mechanical or electrical items.

1.02 <u>RELATED REQUIREMENTS SPECIFIED ELSEWHERE</u> Section 01110- Summary of Work - Single Contract. Section 01738- Selective Demolition. Section 01740- Cleaning.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u> For replacement of work removed: Comply with Specifications.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

- A. General:
 - 1. Do not endanger any other work by cutting or altering work or any part of it.
 - 2. Do not cut or alter work of another contractor without the written consent of Architect.
 - 3. Patching and refinishing shall be executed by the trade experienced in such finishing work.

B. Prior to cutting:

- 1. Provide shoring, bracing and support as required to maintain structural integrity of project.
- 2. Provide protection for other portions of project.
- 3. Provide protection from elements.
- 4. Advise Architect designating time work will be uncovered to provide for observation.

3.02 <u>PERFORMANCE</u>

- A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of repairs and new work.
- B. Execute excavating and backfilling by methods which will prevent damage to other work and will prevent settlement.
- C. Execute fitting and adjustment of products to provide a finished installation to comply with specified tolerances, finishes.
- D. Cut existing concrete openings for piping, floor drains, etc., by core drilling.

- E. Cut existing walls, floors, ceilings, roofs, etc. necessary for the proper installation of new materials, equipment, mechanical or electrical items. Provide all necessary framing, lintels, hangers, etc. to maintain the structural integrity of the building system after cutting.
- F. Employ original installer to perform cutting and patching for exposed finished surfaces.
- G. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of Contract Documents.
- H. Contractor is responsible for cost to restore or patch adjacent surfaces to original condition.
- I. Fit work airtight to pipes, sleeves, ducts, conduits and other penetrations.
- J. Refinish entire surface as necessary to provide an even finish.
 - 1. Continuous surfaces: To nearest intersections.
 - 2. Assembly: Entire refinishing.

SECTION 01738 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Selective Demolition work included in project.
 - 2. Project demolition conditions.
 - 3. Electrical, Plumbing and HVAC Demolition.
 - 4. Utility demolition.
 - 5. Subsurface filling.
 - 6. Protection.

1.02 <u>RELATED REQUIREMENTS SPECIFIED ELSEWHERE</u> Section 01110 - Summary of Work - Single Contract. Section 01520 - Temporary Construction.

1.03 WORK INCLUDED

- A. The extent of demolition work shown on drawings and specified herein, including, but not limited to:
 - 1. Removing existing, piping and components, both exposed to view and concealed.
 - 2. Removing existing lighting and electrical distribution, switches, outlets, conduit and other devices both exposed to view and concealed.
- B. The Owner shall have the option of retaining any item removed. The Contractor shall deliver these items to the Owner's designated storage area. Any items not retained by the Owner shall be disposed of offsite by the Contractor. All items are to remain property of the Owner unless specifically designated otherwise.
- C. Some removed items are to be salvaged for re-use. Drawings indicate extent of such work.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 PROJECT DEMOLITION CONDITIONS

- A. Conditions of Structures:
 - 1. The Owner assumes no responsibility for actual conditions of structures to be demolished.
- B. Conditions of the structure existing at time of inspection for bidding purposes will be maintained by Owner in so far as possible. However, variations within structure may occur by Owner=s removal and salvage operations prior to start of demolition work.
- C. Pollution Controls:
 - 1. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level.
 - 2. Comply with governing regulations pertaining to environmental protection.
- D. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

- E. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of work.
- F. Partial Removal:
 - 1. Items of salvable value to Contractor, and not retained by Owner, may be removed from structure as work progresses. Salvaged items must be transported from site as they are removed.
 - 2. Storage or sale of removed items on site will not be permitted.
 - 3. Store items noted on drawings and specified to be salvaged for use in the project, so as to prevent damage or deterioration.
- G. Disposal of Demolished Materials:
 - 1. Remove from site debris, rubbish, and other materials resulting from demolition operations. Pay all fees related to removal and dumping.
 - 2. Remove and dispose of interior demolition debris off job site.
 - 3. Burning of removed materials from demolished structures will not be permitted.
 - 4. Transport materials removed from demolished structures and dispose of off site.
- H. Traffic:
 - 1. Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, occupied areas, and other adjacent occupied or used facilities.
 - 2. Do not close or obstruct streets, walks or other occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- I. Protections:
 - 1. Ensure safe passage of persons around or through area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons. Provide protection in accordance with ANSI/NFPA 241.
 - 2. Erect temporary covered passageways as required by the Owner or authorities having jurisdiction.
- J. Use of explosives will not be permitted.
- K. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.
- L. Repair any damage to property which is to remain in use, or that of any person, or persons on or off site caused by the demolition work without additional expense to Owner.
- M. Use of jackhammers during normal operating hours of the facility will not be permitted.

3.02 <u>ELECTRICAL</u>

- A. Visit the site before submitting a bid to observe existing conditions.
- B. When outlets are covered up or are otherwise rendered inaccessible, all wiring shall be removed to the source. If a circuit that must remain in service is interrupted, it shall be reconnected by the most inconspicuous means so that it remains operational, with the same capacity as before. All building surfaces damaged, and openings left by removal of boxes, conduit, or other equipment shall be repaired. All holes left in junction boxes, switches, panels and other equipment shall be closed.
- C. Lighting fixtures, wiring devices, panelboards, and conductors removed shall be offered to the Owner's Representative. If he chooses to retain these items or a part of these items, turn those chosen over to him. Items rejected by Owner's Representative shall be removed from the project site by the Contractor.

3.03 <u>PLUMBING</u>

A. Visit the site before submitting a bid to observe existing conditions.

3.04 <u>HVAC</u>

A. Visit the site before submitting a bid to observe existing conditions.

3.05 UTILITY DEMOLITION

- A. Utility Services:
 - 1. Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
 - 2. Allow no interruption in service unless coordinated with Owner at least 72 hours in advance.
- B. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- C. Cap all utility lines terminated by the demolition work in a manner approved by the governmental authorities and utility companies having jurisdiction.
- D. Mark location of disconnected utilities. Identify and indicate capping location on project record documents.

3.06 SUBSURFACE FILLING

- A. Filling Voids:
 - 1. Completely fill below-grade areas and voids resulting from demolition of structures.
 - 2. Perform filled and compaction in accordance with requirements of Section 02200 Earthwork.

3.07 PROTECTION

- A. Provide temporary construction in accordance with requirements of Section 01520- Temporary Construction as required in all areas of demolition work.
- B. Provide levels of protection as deemed necessary by Owner for protection of public into space, project, and site.

SECTION 01740 - CLEANING

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Description of general cleaning requirements.
 - 2. Regulatory agency requirements.
 - 3. Cleaning during construction.
 - 4. Final Cleaning.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

A. Cleaning for Specific Products of Work: Specification Section for that work, including Divisions 15 and 16.

1.03 DESCRIPTION

- A. The General Contractor is responsible for all cleaning unless specifically noted otherwise.
- B. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
- C. Remove temporary piping and wiring: by respective contractors.
- D. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surface; leave project clean and ready for occupancy.

1.04 REGULATORY AGENCY REQUIREMENTS

- A. Maintain project in accord with Occupational Safety & Health Act of 1970 as amended, in terms of clean up.
- B. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains, or bury below ground.

PART 2 - PRODUCTS

2.01 MATERIAL

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacture.

PART 3 - EXECUTION

- 3.01 CLEANING DURING CONSTRUCTION
 - A. Execute cleaning to insure that building, grounds and public properties are maintained free from accumulations of waste material and rubbish on a daily basis by all trades.
 - B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
 - C. At reasonable intervals during progress of Work, clean site and public properties, and dispose of waste materials, debris and rubbish.

- D. Provide on-site containers for collection of waste materials, debris and rubbish.
- E. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off Owner's property.
- F. Handle materials in a controlled manner with as few handlings as possible; do not drop or throw materials from heights.
- G. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- H. Ensure that no construction materials or items are accessible to public on site or grounds.

3.02 FINAL CLEANING

- A. Employ experienced workman or professional cleaners for final cleaning.
- B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces.
- C. Remove grease, dust, dirt, stains, labels, fingerprints and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to shine finish.
- D. Wash and clean all glass, removing labels.
- E. Clean and polish fixtures, equipment and materials.
- F. Repair, patch and touch-up marred surfaces to specified finish, to match adjacent surfaces.
- G. Vacuum all carpeted areas; wax and polish all tile and resilient flooring areas.
- H. Remove all foreign materials from roof and site area.
- I. Broom clean paved surfaces; rake clean other surfaces of grounds.
- J. General Contractor shall be responsible for cleaning all equipment installed by the respective contractors.
- K. Mechanical and Electrical Work:
 - 1. Respective contractors shall perform cleaning of their equipment.
 - 2. Mechanical contractor shall clean all strainers in his respective piping work.
 - 3. Replace throw-away type air conditioning filters or media if units were operated during construction, or clean ducts, blowers and coils if air conditioning units were operated without filters.
 - 4. This does not include replacing filters used for performance testing and balancing.
 - 5. Replace burned out or inoperative pilot and lighting lamps; by contractor furnishing respective equipment or fixture.
 - 6. Replace all bulbs in fixtures used for temporary lighting during construction.
- L. Conduct final cleaning and preparation of surfaces and materials as per manufacturer's recommendation and in strict accordance with manufacturer's guidelines.

- M. All materials and finishes shall be stripped, waxed, polished, buffed, etc., upon Substantial Completion for their use by Owner.
- N. Owner will assume responsibility for cleaning as time designated on Certificate of Substantial Completion, Conditional Acceptance or partial occupancy, whichever is first, for Owner's acceptance of Project or portion thereof.

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1- GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Administrative procedures in closing out the work.
 - 2. Procedures for Substantial Completion.
 - 3. Procedures for Final Inspection.
 - 4. Required contractor guarantees.
 - 5. Evidence of payments and release of liens.
 - 6. Final adjustment of accounts.
 - 7. Final Application and Certificate for Payment.
 - 8. Post construction inspection.
 - 9. Closeout submittals required are specified in Section 01780.
 - 10. Closeout maintenance materials required are specified in Section 01781.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 00700 - General Conditions. Section 00810 - Supplementary General Conditions. Section 00500 - Agreement Form. Section 01110 - Summary of Work - Single Contract. Section 01210 - Cash Allowances. Section 01220 - Contingency Allowance. Section 01740 - Cleaning. Section 01780 - Closeout Submittals.

1.03 SUBSTANTIAL COMPLETION

- A. Submit written certification to Architect that project or designated portion of project is substantially complete and ready for use by Owner.
- B. Architect will make an inspection within a reasonable time after receipt of such notice. The Contractor is responsible for the final punchlist inspection in accordance with the General Conditions. No inspection by the Architect will be made until the Contractor submits written certification that the punchlist has been issued and complete. The Architect's Substantial Completion inspection is not for the purpose of preparing a "to-do" list for the Contractor to use in finishing the work. If it becomes apparent at the time of the Substantial Completion inspection that items affecting life safety, accessibility, security, or full intended use of space are not complete, the inspection will be terminated and the Contractor will be liable for the costs of re-inspection.
- C. Should Architect consider that work is not substantially complete:
 - 1. Architect shall immediately notify Contractor, in writing, stating reasons.
 - 2. Contractor to remedy deficiencies and send second written notice of substantial completion to Architect.
 - 3. Architect will re-inspect Work.
 - 4. Contractor to pay costs of Architect's re-inspection.
- D. When Architect/Engineer considers that work is substantially complete; Architect will prepare and issue a Certificate of Substantial Completion, AIA Document G704, complete with signatures of Owner and Contractor, accompanied by Contractor's list of items to be completed or corrected ("Punchlist") as verified and amended by the Architect. Retainage amounts will be adjusted per General Conditions and Supplementary General Conditions.

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1.04 FINAL INSPECTION

- A. Contractor shall submit written certification that:
 - 1. Contract Documents have been reviewed.
 - 2. Work has been completed and inspected in accordance with Contract Documents.
 - 3. Equipment and systems have been tested in presence of Owner's representative and are operational.
 - 4. Work is completed, and ready for final inspection.
 - 5. If any items from the Certificate of Substantial Completion Inspection are not completed, the final inspection will be terminated and the Contractor will be liable for the costs of re-inspection.
- B. Architect will make final inspection after receipt of certification.
- C. Should Architect consider that work is incomplete or defective:
 - 1. He shall promptly notify Contractor, in writing, stating reasons.
 - 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Architect/Engineer certifying that Work is complete.
 - 3. Architect will re-inspect Work.
 - 4. Contractor to pay costs of Architect's re-inspection.
 - 5. Final payment will not be released.
- D. When Architect finds that work is acceptable in accordance with Contract Documents, he shall request contractor to prepare Project Closeout Submittals in accordance with Section 01780.

1.05 <u>GUARANTEES</u>

- A. Contractor agrees to make good all damage to the construction of building or site or equipment which in the opinion of the Architect is a result of or incidental to the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the specifications.
- B. In case repairs become necessary, the Owner will give written notice to the Contractor to make same and in case of failure of the Contractor to commence such repairs within 30 days after such notice, the Owner may make the repairs either by its own employees or by independent contract and may thereupon recover from the Contractor and his Sureties the cost of the repairs so made together with the cost of supervision and inspection thereof. The Owner will have sixty (60) days after the expiration of said guarantee period in which to notify the Contractor of any such repairs necessary on the date of such expiration. The determination of the necessity for repairs shall rest entirely with the Architect whose decision upon the matter shall be final and obligatory upon the Contractor.
- C. The Guarantees herein stipulated shall extend to the whole body of the improvement and all its appurtenances.

1.06 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Contractor to execute and submit:
 - 1. Contractor's Affidavit of Payment of Debts and Claims (AIA Document G706).
 - 2. Contractor's Affidavit of Release of Liens (AIA Document G706A)
 - 3. Consent of Surety to Final Payment (AIA Document G707).
- B. All submittals shall be duly executed before delivery to Architect.

2.

1.07 FINAL ADJUSTMENT OF ACCOUNTS

- A. Submit final statement of account to Architect.
- B. Statement shall reflect all adjustments:
 - 1. Original Contract Sum.
 - Additions and deductions resulting from:
 - a. Change Orders.
 - b. Cash Allowances
 - c. Contingency Allowance.
 - d. Unit Prices
 - e. Deductions for uncorrected work.
 - f. Penalties and Bonuses.
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.
- C. Architect will prepare final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Orders or Allowance Adjustments.

1.08 FINAL APPLICATION AND CERTIFICATE FOR PAYMENT:

- A. Contractor shall submit final application in accordance with procedures and requirements of General and Supplementary Conditions prior to submission of Final Application and Certificate for Payment.
- B. Architect will review Final Application and issue Final Certificate in accordance with provisions of General Conditions.
- C. Should final completion be materially delayed through no fault of Contractor, Architect may issue a Semi-Final Certificate for Payment in accordance with provisions of General Conditions.

1.09 POST CONSTRUCTION INSPECTION

- A. Prior to expiration of one year from date of Substantial Completion, Architect may make visual inspection of Project in company with Owner and Contractor to determine whether correction of Work is required in accordance with provisions of General Conditions.
- B. For Guarantee beyond one year Architect may make inspections at request of Owner after notification to Contractor.
- C. Architect will promptly notify Contractor, in writing, of any observed deficiencies.
- D. Any/all corrections to work at that time to be at Contractor's expense.

PART 1- GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Operation and Maintenance Manuals.
 - 2. Product Warranties.
 - 3. Project Record Documents (As-Built Drawings).
 - 4. Spare-Parts.
 - 5. Certificates of Inspection.
 - 6. Food Service Equipment Maintenance Manuals.
 - 7. Keys and Keying Schedule.
 - 8. Instruction of Owner's Personnel.
 - 9. Certificate of Occupancy.
 - 10. Certification of Asbestos and Lead-Based Paint.
 - 11. Closeout maintenance materials required are specified in Section 01781.
- B. Unless specifically permitted by the Architect, the Contractor is to provide all items listed herein to the Owner via the Architect prior to the date of Substantial Completion.

1.02 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Section 00700 - General Conditions.

Section 00810 - Supplementary General Conditions.

Section 01110 - Summary of Work - Single Contract.

Section 01130 - General Construction Requirements.

Section 01320 - Construction Progress Documentation.

Section 01770 - Closeout Procedures.

Respective Specification Sections.

1.03 OPERATION AND MAINTENANCE MANUALS

- A. Submission Requirements:
 - 1. Furnish Owner with all manual information electronically on CD in PDF format.
 - 2. Furnish Owner with two (2) sets of bound hard copy manuals.
 - 3. Submit to Architect for review of information and forwarding to Owner for Owner's records.
- B. Preparation:
 - 1. Prepare data by personnel experienced in maintenance and operation of described products.
 - 2. Obtain information directly from manufacturer of equipment or product.

C. Format:

- 1. Prepare organization of data in the format of an instructional manual.
- 2. Cover:
 - a. Identify manual with title OPERATION AND MAINTENANCE MANUAL.
 - b. Identify title of Project.
 - c. Identify subject matter of contents.
- 3. Organization:
 - a. Divide sections for each separate product and system, with description of product and major component parts of equipment.
 - b. For any hard copies required, provide tabbed dividers between each section.

- 4. Text:
 - a. Include all manufacturer's published data and product cutsheets.
 - b. For any hard copies required, provide on 20 pound paper.
- 5. Drawings:
 - a. Provide applicable drawing files from manufacturer or Architect's drawing files as required. Contact Architect to obtain PDF drawing files as needed.
 - b. For any hard copies required, provide with reinforced punched binder tab. Bind in with text. Fold larger drawings to size of text pages.
- 6. Binders (for any hard copies required):
 - a. Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size.
 - b. When multiple binders are used, correlate data into related consistent groupings.
- D. Contents:
 - 1. Table of Contents:

Provide title of Project; names, addresses, and telephone numbers of Architect/Engineer, Subconsultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

2. For Each Product or System:

List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.

- Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- 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.
- Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.
- 6. Warranties:
 - Include a copy of each.
- 7. Reports:

Include a copy of all test reports, certificates, testing and balance data, etc.

- E. Manual for Materials and Finishes:
 - Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
 - 2. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
 - Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.
 - Additional Requirements: As specified in individual Product specification Sections.
 - 5. Provide a list of all materials and finishes with scanned photo files or actual samples of all products.

- F. Manual for Equipment and Systems:
 - 1. Each Item of Equipment and Each System:

Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

- 2. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- 3. 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.
- Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- 5. Include color coded wiring diagrams as installed.
- 6. Provide servicing and lubrication schedule, and list of lubricants required.
- 7. Include manufacturer's published operation and maintenance instructions.
- 8. Include sequence of operation by controls manufacturer.
- 9. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- 10. Provide control diagrams by controls manufacturer as installed.
- 11. Provide Contractor's coordination drawings, with color coded piping diagrams as installed.
- 12. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- 13. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- 14. Include test and balancing reports as specified in Section 15990 Testing, Adjusting and Balancing.
- 15. Additional Requirements as specified in individual Product specification Sections.
- 16. Provide a list of design data, settings, setpoints, etc., as applicable for equipment.

1.04 PRODUCT WARRANTIES

- A. Submission Requirements:
 - 1. Furnish Owner with all warranty information electronically on CD in PDF format.
 - 2. Furnish Owner with two (2) sets of bound hard copy warranties.
 - 3. Submit to Architect for review of information and forwarding to Owner for Owner's records.
- B. Preparation:
 - 1. Gather Warranties required for specific Products or Work as specified in each individual Section.
 - 2. Obtain information directly from responsible Subcontractor, supplier, and manufacturer of equipment or product within 10 days after completion of applicable item of Work.
 - 3. Except for items put into use with Architect approval, leave date of beginning of time of warranty until the Date of Final Acceptance is determined.
 - 4. Verify that documents are in proper form, are complete, contain full information, are notarized, and are fully executed and valid.
 - 5. Co-execute submittals when required.
 - 6. Retain warranties until time specified for submittal.

- C. Format:
 - 1. Prepare organization of data in the format of an instructional manual.
 - 2. Cover:
 - a. Identify manual with title WARANTIES.
 - b. Identify title of Project.
 - c. Identify subject matter of contents.
 - 3. Organization:
 - a. Separate each warranty keyed to the Table of Contents listing.
 - Provide full information, using separate typed sheets as necessary.
 - b. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - c. For any hard copies required, provide tabbed dividers between each warranty.
 - 4. Binders (for any hard copies required):
 - a. Commercial quality, 8-1/2 x 11 inch three D side ring binders with durable plastic covers; 2 inch maximum ring size.
 - b. When multiple binders are used, correlate data into related consistent groupings.
- D. Contents, Each Volume:
 - 1. Table of Contents:

Neatly typed, in sequence of Table of Contents of Project Manual, with each item identified with number and title of specification Section in which specified, and name of Product or Work item.

- E. Time of Submittals:
 - 1. For equipment or component parts of equipment put into service during construction with Architects approval, submit documents within 10 days after acceptance.
 - 2. Make other submittals within 10 days after Date of Final Completion, prior to final Application for Payment.
 - 3. For items of Work for which acceptance is delayed beyond Date of Final Completion, submit within 10 days after acceptance.

1.05 PROJECT RECORD DRAWINGS ("AS-BUILTS")

- A. Submission Requirements:
 - 1. Furnish Owner with original record document prints.
 - 2. Furnish Owner with one (1) additional hard copy set of record document prints.
 - 3. Furnish Owner with all as-built information electronically on CD in PDF format.
 - 4. Submit to Architect for review of information and forwarding to Owner for Owner's records.
- B. Project Record Documents required:
 - 1. Marked-up copies of Contract Drawings.
 - 2. Marked-up copies of Shop Drawings.
 - 3. Marked-up copies of Specifications, addenda and Contract Modifications.
 - 4. Marked-up Product Data submittals.
 - 5. Field records for variable and concealed conditions.
 - 6. Record information on Work that is recorded only schematically.
- C. Maintenance of Documents:

Store record documents in field office apart from Contract Documents used for construction. Do not permit Project Record Documents to be used for construction purposes. Maintain and protect record documents from damage in a clean, dry, legible condition. Make documents available at all times for inspection by Architect.

CLOSEOUT SUBMITTALS

D. Record Drawings:

- 1. During construction, maintain a set of black-line white-prints of Contract Drawings and Shop Drawings for Project Record Document purposes.
 - a. Mark these Drawings to indicate actual installation where installation varies from installation shown originally. Give particular attention to information on concealed elements which would be difficult to identify or measure and record later. Items required to be marked include but are not limited to:
 - 1) Dimensional changes to Drawings.
 - 2) Revisions to details shown on Drawings.
 - 3) Depths of foundations below first floor.
 - 4) Locations and depths of underground utilities.
 - 5) Revisions to routing of piping and conduits.
 - 6) Revisions to electrical circuitry.
 - 7) Actual equipment locations.
 - 8) Duct size and routing.
 - 9) Locations of concealed internal utilities.
 - 10) Changes made by Contract Modification.
 - 11) Details not on original Contract Drawings.
 - b. Responsibility for Markup and Supervision:

Contractor Quality Control Representative; as specified in Section 01400 - Quality Control. Where feasible, individual or entity who obtained record data, whether individual or entity is installer, subcontractor, or similar entity, is required to prepare mark-up on Record Drawings.

- 1) Accurately record information in an understandable Drawing technique.
- 2) Record data as soon as possible after it has been obtained. In case of concealed installations, record and check mark-up prior to concealment.
- 3) Contractor Quality Control Representative: Affix signature and certify accuracy of Record Drawings.
- c. Mark completely and accurately record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.
- d. Mark record sets with red erasable colored pencil; use other colors to distinguish between changes for different categories of Work at same location.
- e. Mark important additional information which was either shown schematically or omitted from original Drawings.
- f. Note construction change directive numbers, alternate numbers, Contract Modification numbers and similar identification.
- g. At time of Final Acceptance, submit record Drawings to Architect for Owner records. Organize into sets, bind and label sets for Owner's continued use.
- 2. Preparation of Transparencies:
 - a. Immediately prior to inspection for Final Acceptance, review completed marked-up record Drawings with Architect. When authorized, prepare a full set of corrected transparencies of Contract Drawings and Shop Drawings.
 - b. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each Drawing; include printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each Drawing.
 - c. Refer instances of uncertainty to Architect for resolution.
 - d. One set of transparencies of original Contract Drawings will be furnished to Contractor by the Owner for use in recording changes and additional information. Other printing as required is Contractor's responsibility.

1583.01 10/02/17

e. Review of Transparencies:

Before copying and distributing, submit corrected transparencies and original marked-up prints to Architect for review. When acceptable, Architect will initial and date each transparency, indicating acceptance of general scope of changes and additional information recorded, and of quality of drafting.

- f. Transparencies and original marked-up prints will be returned to Contractor for organizing into sets, printing, binding and final submittal.
- 3. Copies and Distribution:

After completing preparation of transparency Record Drawings, print (three) 3 black-line prints of each Drawing, whether or not changes and additional information were recorded. Organize copies into manageable sets. Bind each set with durable paper cover sheets, with appropriate identification, including titles, dates and other information on cover sheets.

- a. Organize and bind original marked-up set of prints that were maintained during construction in same manner.
- b. Organize record transparencies into sets matching print sets. Place each set in durable tube-type Drawing containers with end caps. Mark end cap of each container with suitable identification.
- E. Additional Record Submittals:
 - 1. Refer to other specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Immediately prior to Final Acceptance, complete additional records and place in order, properly identified and bound or filed, ready for use and reference. Submit to Architect.
 - a. Categories of requirements resulting in miscellaneous records include, but are not limited to the following:
 - 1) Field records on excavations and foundations.
 - 2) Field records on underground construction and similar Work.
 - 3) Survey showing locations and elevations of underground lines.
 - 4) Inverted elevations of drainage piping.
 - 5) Survey establishing building lines and levels.
 - 6) Authorized measurements utilizing unit prices or allowances.
 - 7) Records of plant treatment.
 - 8) Ambient and substrate condition tests.
 - 9) Certifications received in lieu of labels on bulk products.
 - 10) Batch mixing and bulk delivery records.
 - 11) Testing and qualification of tradesmen.
 - 12) Documented qualification of installation firms.
 - 13) Load and performance testing.
 - 14) Inspections and certifications by governing authorities.
 - 15) Leakage and water-penetration tests.
 - 16) Fire resistance and flame spread test results.
 - 17) Final inspection and correction procedures.

1.06 <u>SPARE-PARTS</u>

- A. Provide Products, replacement stock, spare parts, maintenance, and extra materials in quantities specified in individual specification Sections.
- B. Deliver to Project Site and place in location as directed by Architect; obtain receipt prior to Final Payment.

1.07 CERTIFICATES OF INSPECTION

- A. General.
- B. Plumbing.
- C. HVAC.
- D. Electrical.
- E. Fire Sprinkler.
- F. Fire Alarm.
- G. Elevator.
- H. Exhaust Hood.

1.08 <u>FOOD SERVICE EQUIPMENT MAINTENANCE MANUALS:</u>

- A. Furnish Owner with three (3) separately bound "Food Facilities Equipment Maintenance Manual" for all kitchen equipment, exhaust hoods and specialties. Submit manual to Architect for review and forward to Owner.
- B. Instructions for maintenance of food facilities equipment, including the following:
 - 1. Care of finished surfaces.
 - 2. Spare parts lists.
 - 3. Data Sheets.
 - 4. Period of warranty and date warranty goes into effect.
 - 5. List of service agencies responsible for each item of equipment including fabricated equipment.
 - 6. Food Service Equipment Contractor's name and telephone number.

1.09 KEYS

A. Submit keys and keying schedule to Owner.

1.10 INSTRUCTION OF OWNER'S PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment, and maintenance of all products, equipment and systems.
- B. Such instructions shall occur at a time designated by the Architect/Engineer at the completion of the job at a meeting set up by the contractor and attended by the representatives of the Owner and manufacturer.
- C. Services of factory instructor or representative to teach Owner's representative on operation of equipment will be arranged by the contractor, shall begin after equipment has been placed in satisfactory operating condition and shall continue for a period of time as deemed necessary by the Architect.
- D. Contractor shall verify in writing that such periods of instruction have been held with the Owner's representative.
- E. Minimum length of training session to be two (2) hours.
- F. Session will need to be videotaped by Contractor for use by Owner.
- G. Notify Architect to attend all training sessions.

CLOSEOUT SUBMITTALS

1.11 CERTIFICATE OF OCCUPANCY

- A. Where the Local Authority of Location of project requires either temporary or permanent Certificate of Occupancy, obtain and pay for Certificates and furnish a copy to the Architect for forwarding to the Owner.
- B. Contractor to verify requirements with Local Building Officials.

1.12 CERTIFICATION OF ASBESTOS MATERIAL AND LEAD-BASED PAINT

- A. The use of asbestos containing materials, in excess of 1 percent as defined by applicable US Environmental Protection Agency regulations, is prohibited in the project.
- B. The use of lead-based paint is prohibited in the project.
- C. Prepare and submit to the Architect the "Certification of Asbestos and Lead-Based Paint (Existing Building) " for existing buildings or portions of buildings (attached).
- D. Prepare and submit to Architect the "Certification of Asbestos and Lead-Based Paint (New Work) " for new material furnished or installed as part of the Work (attached).

Certification of Asbestos and Lead-Based Paint

(Existing Building)

To:	Kovert Hawkins Architects, Inc.
Subject:	Certification for a building built after 1990
Facility name:	
Facility address:	
was constructed applicable US E	ting building: nalty of perjury under the laws of the United States that the following is true and correct. This building after 1990 and is free of asbestos containing material in excess of 1 percent as defined by invironmental Protection Agency regulations, and lead-based paint except as specifically listed below. n includes all areas of the building(s), including but not limited to; the roof and flooring.
This certification	

Signature	
-----------	--

Address:

Telephone:

Date executed:

Materials containing asbestos/lead-based paint	Location/room within facility
The penalty for making a false statement is p	

The penalty for making a false statement is prescribed by 18 USC 1001.

CLOSEOUT SUBMITTALS

Certificate of Asbestos and Lead-Based Paint

(New Work)

То:	Kovert Hawkins Architects, Inc.
Subject:	Certification for new construction
Facility name:	

Facility address:

Certification for new construction:

This Contractor hereby certifies that no asbestos-containing material in excess of 1 percent as defined by applicable US Environmental Protection Agency regulations, and lead-based paint has been furnished or installed at the referenced project.

Contractor name:

Signature:

Address:

Telephone:

Date executed:

The penalty for making a false statement is prescribed by 18 USC 1001.

CLOSEOUT SUBMITTALS

SECTION 01781 - CLOSEOUT MAINTENANCE MATERIALS

PART 1- GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Section Includes:
 - 1. Maintenance Materials.
 - 2. Owner Verification.

1.02 MAINTENANCE MATERIALS – **BASE BID**

- A. General Requirements:
 - 1. No maintenance stock to be used by the Contractor for any reason.
 - 2. Provide maintenance stock for each and every style, type or color specified for each product.
 - 3. Provide maintenance stock at end of the project and directly to the Owner.
 - 4. Wrap and protect all materials for storage by the Owner.
 - Packages and containers to be manufacturer's unopened and unsealed packaging. If quantities listed exceed a manufacturer's single container, additional unopened and unsealed containers shall be supplied until minimum quantity is met.
 - 6. Packages and containers shall include manufacturer's label and product information.
 - 7. Paint products shall include manufacturer's color and mix formulas.
- B. Porcelain Tile Flooring, Base and Wall Tile:
 - 1. Provide to Owner maintenance stock of at least (6) floor tiles.
 - 2. Provide to Owner maintenance stock of at least (6) base tiles.
 - 3. Provide to Owner maintenance stock of at least (2) wall tiles.
- C. Acoustical Ceiling Panels:
 - 1. Provide to Owner maintenance stock of at least (24) panels.
- D. Luxury Vinyl Plank Flooring:
 - 1. Provide to Owner maintenance stock of at least (10) tiles.
- E. Rubber Base:
 - 1. Provide to Owner maintenance stock of at least (20) linear feet.
- F. Modular Carpet Tiles:
 - 1. Provide to Owner maintenance stock of at least (6) tiles.
- G. Paint:
 - 1. Provide to Owner maintenance stock of at least (2) unopened gallon containers.

1.03 MAINTENANCE MATERIALS – ALTERNATE NO. 1

- A. General Requirements:
 - 1. No maintenance stock to be used by the Contractor for any reason.
 - 2. Provide maintenance stock for each and every style, type or color specified for each product.
 - 3. Provide maintenance stock at end of the project and directly to the Owner.
 - 4. Wrap and protect all materials for storage by the Owner.
 - 5. Packages and containers to be manufacturer's unopened and unsealed packaging. If quantities listed exceed a manufacturer's single container, additional unopened and unsealed containers shall be supplied until minimum quantity is met.
 - 6. Packages and containers shall include manufacturer's label and product information.
 - 7. Paint products shall include manufacturer's color and mix formulas.

CLOSEOUT MAINTENANCE MATERIALS

- B. Porcelain Tile Flooring, Base and Wall Tile (for each tenant space):
 - 1. Provide to Owner maintenance stock of at least (6) floor tiles.
 - 2. Provide to Owner maintenance stock of at least (6) base tiles.
 - 3. Provide to Owner maintenance stock of at least (2) wall tiles.
- C. Acoustical Ceiling Panels:
 - 1. Provide to Owner maintenance stock of at least (12) panels (for each tenant space).
- D. Luxury Vinyl Plank Flooring:
 - 1. Provide to Owner maintenance stock of at least (5) tiles (for each tenant space).
- E. Rubber Base:
 - 1. Provide to Owner maintenance stock of at least (10) linear feet (for each tenant space).
- F. Modular Carpet Tiles:
 - 1. Provide to Owner maintenance stock of at least (3) tiles (for each tenant space)...
- G. Paint:
 - 1. Provide to Owner maintenance stock of at least (1) unopened gallon containers (for each tenant space).
- 1.04 OWNER VERIFICATION
 - A. Owner to sign-off receipt of each item.
 - B. Provide to Architect, copy of this Specification Section with Owner's signature next to each item listed, verifying that they have been received by the Owner's representative and entered into their stock.

SECTION 02010 - SUBSURFACE EXPLORATION

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Sub-Surface Exploration Report:
 - 1. Prepared by: Asher Engineering, Inc. 1021 S Floyd Street Louisville, KY 40203 (502) 589-0073
 - 2. Report is intended for informational purposes of interpolating and understanding subsurface conditions of the project site, and becomes a part of the Contract Documents.

B. Boring Logs:

- 1. Included for Contractor's information, but not a warranty of subsurface conditions.
- C. Representations or Warranties:
 - 1. None are made by the inclusion of this report.
 - 2. Neither the Owner nor the Architect//Engineer will be responsible for interpretations or conclusions drawn from this report by the Contractor.
 - 3. Data is made available solely for the convenience of the Contractor.
- D. Additional Investigation:
 - 1. Contractor should visit the site to acquaint himself with site conditions.

GEOTECHNICAL ENGINEERING STUDY

PROPOSED VILLAGE AT W. JEFFERSON SITE NORTHWEST CORNER W. JEFFERSON ST. AND 12TH ST. LOUISVILLE, KENTUCKY

ASHER PROJECT NO. 17-017

Prepared For:

Kovert Hawkins Architects 630 Walnut Street Jeffersonville, IN 47130

Prepared By:

Asher Engineering, Inc. 1021 S. Floyd Street Louisville, Kentucky 40203

March 7, 2017

Asher Engineering, Inc.

Environmental & Engineering Consulting

March 7, 2017

Mr. Hal E. Kovert, AIA Kovert Hawkins Architects 630 Walnut Street Jeffersonville, IN 47130

Re: Geotechnical Engineering Study Village at W. Jefferson Site Northwest Corner W. Jefferson St. and 12th St. Louisville, Kentucky

Dear Mr. Kovert,

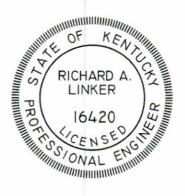
Asher Engineering has completed a Geotechnical Engineering Study for the referenced project. This report contains the findings of our subsurface exploration, geotechnical recommendations to aid design of foundations, and pavements, and construction recommendations with regard to site work; fill placement, and foundation installation and inspection.

We appreciate the opportunity to be of service to you on this project. If we can be of further assistance, or if you have any questions regarding this report, please contact our office.

Sincerely,

Rich Lih

Richard A. Linker, P. E. President



1021 S. Floyd Street • Louisville, Kentucky 40203 • Office: (502) 589-0073 asherinc@aol.com

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APPENDICES

Site Location Map Aerial Photograph Sanborn Maps Location of Test Borings Test Boring Logs

1.0 PROJECT INFORMATION

The subject site is located at the northwest corner of West Jefferson St. and 12th St., in Louisville, Kentucky. The site is currently a flat to gently sloping asphalt paved parking lot with some landscape islands with mature trees. The site had been the east parking lot for the St. Peter's Church since the 1960s. Prior to that, the property was developed with single family houses, a church, and a commercial building (see Sanborn Maps, Appendix).

Proposed for construction is a 2-story L-shaped building with total square footage of 15,134 sq. ft. Asphalt paved parking would be provided at the northwest potion of the site, with an entrance off W. Jefferson Street at the southwest corner of the property.

2.0 SUBSURFACE EXPLORATION

The subsurface conditions were explored by conducting 8 test borings to 15 ft. depth. The boring locations are shown on the sketch in the Appendix. The boring logs (also included in the Appendix) describe the materials and conditions encountered.

The site is in the Ohio River outwash which typically consists of deposited, sands, silts, clayey silts and some silty clays near the ground surface. About 2.5 in. asphalt, and 6 in. crushed stone was encountered at the ground surface across the site. Old fill material consisting of silty soil, with some rock and brick was encountered at Borings 2, 3, 5, 7, and 8. The fill is about 2 to 3 ft. thick at Borings 2, 5, and 8, and about 6 ft. thick at Borings 3 and 7. Borings 1, 4, and 6 encountered no fill. The natural soils consist of soft clayey silt, underlain by fine sandy clay. A medium coarse sand was encountered at about 13 ft. at each boring location. The medium coarse sand was noted to the maximum depth of the boring exploration, 15 ft, below existing grade. No bedrock and no groundwater was encountered in any of the test borings.

3.0 DESIGN RECOMMENDATIONS

The following design recommendations have been developed on the basis of the previously described project characteristics and subsurface conditions. Please notify our office if the project description included herein is incorrect, or if the location of the proposed building is changed. Asher Inc. would then review the new project description to determine if revisions to our recommendations are necessary.

3.1 Site Development

The old asphalt must be removed from the new building and new pavement areas. It is too deteriorated to save. The crushed stone base should be left in place if the planned finish grades allow.

The old fill consists of silty soil with traces of rock and brick. No topsoil, trash, wood, or other deleterious materials were noted in the fill. The old fill is likely associated with the small houses that once occupied the site. It is also possible that some debris, old cellars, or old cisterns or wells could be encountered during construction. The building pad area, and the footing excavations should be carefully inspected to confirm suitable bearing. Any old fill or buried structures would be undercut and removed from the site, and backfilled with crushed stone.

3.2 Foundations

Footings can be proportioned using a net allowable bearing capacity of 2,000 psf for continuous wall and isolated footings. Site Classification D should be used for seismic design. Wall footings must be at least 16 in. wide and column footings must be at least 24 in. wide to provide an adequate factor of safety for bearing capacity. All exterior footings and footings in unheated areas must bear at least 30 in. below final exterior grade for frost protection. Interior footings in heated areas can bear at nominal depths below the floor (at least 12 inches).

3.3 Floor Slabs

The geotechnical engineer should inspect the subgrade with a prooffoll prior to the placement of fill or the crushed stone base. Some undercutting and stabilization with crushed stone may be necessary to stabilize the slab area, especially during wet periods of the year. Upon approval of the subgrade, we recommend that the bus maintenance slab be supported on a 4-in. layer of KY DGA crushed limestone compacted to 100 percent of the standard Proctor.

3.4 Pavements

The subgrade in any new pavement areas should be proofrolled to identify any soft areas that may require undercutting and stabilization. Assuming proper subgrade preparation and drainage, a California Bearing Ratio (CBR) value of 5 is recommended.

In areas that would be limited to automobiles and light trucks, the following asphalt pavement section is recommended.

Automobile and Light Truck Areas	1.0 in. asphalt concrete surface
	2.0 in. asphalt concrete base
	4.0 in. KY DGA
	4.0 in. 3-Minus or Surge Stone

Areas that may experience heavier loading conditions should be provided with the following pavement section.

Heavy Truck Areas	1.0 in. asphalt concrete surface
	3.0 in. asphalt concrete base
	4.0 in. KY DGA
	6.0 in. 3-Minus or Surge Stone

The following rigid pavement section may be used in dock areas.

Rigid Pavement (Concrete)	7.0 in. Concrete
	5.0 in. KY DGA

All paving material should comply with the current Kentucky Department of Highway Specifications. The DGA granular base should be compacted to at least 98 percent of the standard Proctor maximum dry density (ASTM D-698).

Variations in subsurface conditions must be expected during construction. It is therefore recommended that the geotechnical engineer be retained to review the soils-related phases of the project and to correlate the subsurface data with the soil conditions that are encountered during construction.

4.1 Subgrade Preparation

Prior to construction or the placement of new engineered fill, the exposed subgrade should be evaluated by the project geotechnical engineer. The evaluation should include proofrolling of the exposed subgrade with a loaded dump truck. If unsuitable material were disclosed, the geotechnical engineer would recommend an appropriate remedial measure at that time. The silty clay soils encountered just beneath the pavement surface will be sensitive to moisture and heavy construction equipment, and may require aeration and re-compaction or undercutting to reach firm subgrade. The severity of this potential problem depends on the weather conditions prevailing during construction.

The contractor should exercise discretion when selecting equipment sizes and also control surface water while the subgrade soils are exposed. It may be necessary to undercut and stabilize the proposed pavement areas with crushed stone, or use a geotextile fabric to improve the subgrade, especially if the sitework is done during wet weather conditions.

4.2 Engineered Fill

Engineered fill should be placed on a prepared subgrade that has been evaluated by the geotechnical engineer. Engineered fill should be compacted to at least 98 percent of the standard Proctor maximum dry density (ASTM D-698). The geotechnical engineer or his representative should monitor engineered fill placement and compaction operations.

Field density tests should be performed on each lift as necessary to insure that the specified compaction is being achieved. Fill should be placed in horizontal lifts and each lift should be compacted to the specified density. Lift thickness of 8 in. and 12 in. should be used for clayey soils and granular soils, respectively. The on site soils are suitable for use as engineered fill.

4.3 Foundation Excavations

All concrete for foundations should be poured the same day the excavation is made. If this is not practical, the foundation excavation should be adequately protected. Soils exposed in the base of all excavations must be protected against rain and freezing. Surface water should be drained away from all excavations and not allowed to pond.

4.4 Construction Dewatering

At the time of our field investigation, no groundwater was encountered in the depths explored by our borings. Therefore, the water level appeared to be below the expected maximum excavation depth at the site for the expected foundations.

5.0 QUALIFICATIONS

Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either express or implied. Asher, Inc. is not responsible for the independent conclusion, opinions or recommendations made by others based on the field exploration and laboratory test data presented in this report.

The nature and extent of variation and change in the subsurface conditions at the site may not become evident until the course of construction. Construction monitoring by the geotechnical engineer or his representative is therefore considered necessary to verify the subsurface conditions and to check that the soil connected construction phases are properly carried out. If significant variations or changes are in evidence, it may then be necessary to reevaluate the recommendations of this report.

Furthermore, if the project characteristics are altered significantly from those discussed in this report, if the project information contained in this report is incorrect, or if additional information becomes available, a review must be made to determine if any modification in the recommendations will be required.

APPENDIX

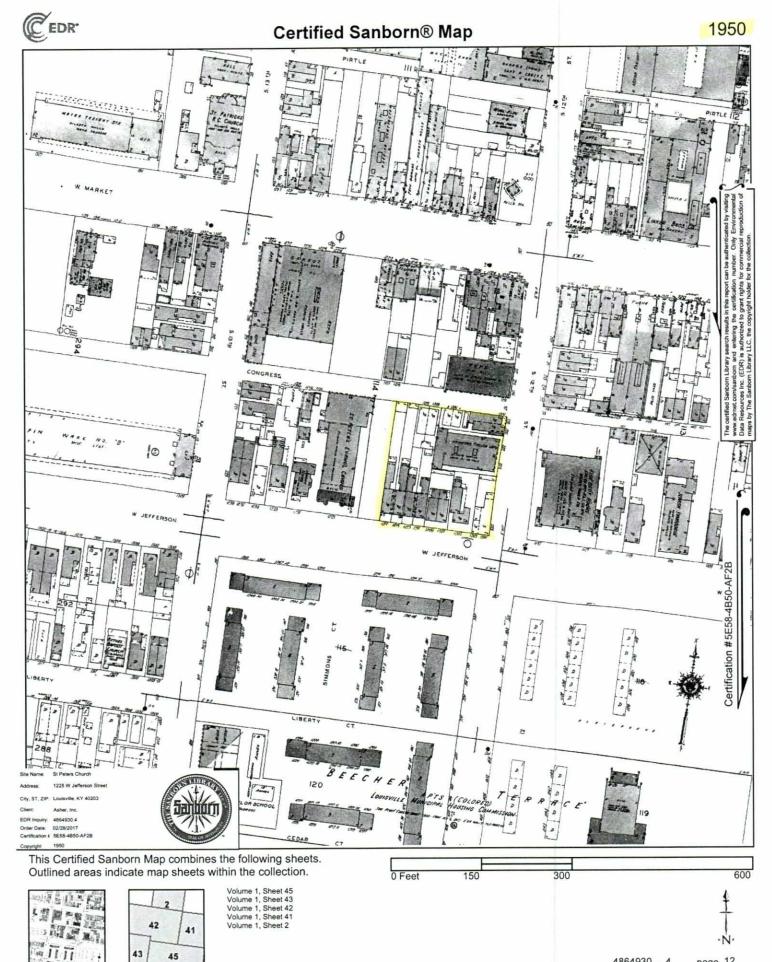
Site Location Map Aerial Photograph Sanborn Maps Location of Test Borings Test Boring Logs



Kovert Hawkins

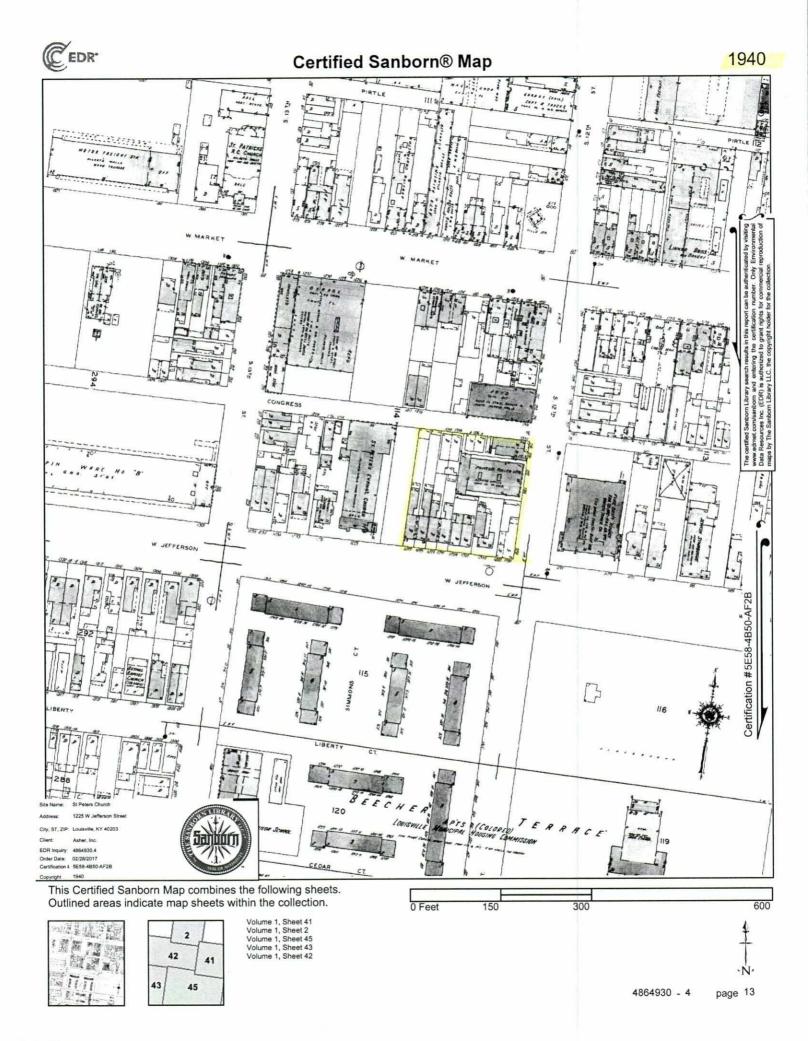
Site Location Photo The Village at W. Jefferson Louisville, Kentucky Asher Engineering, Inc. Project No. 17-017 Date Photo September 2016

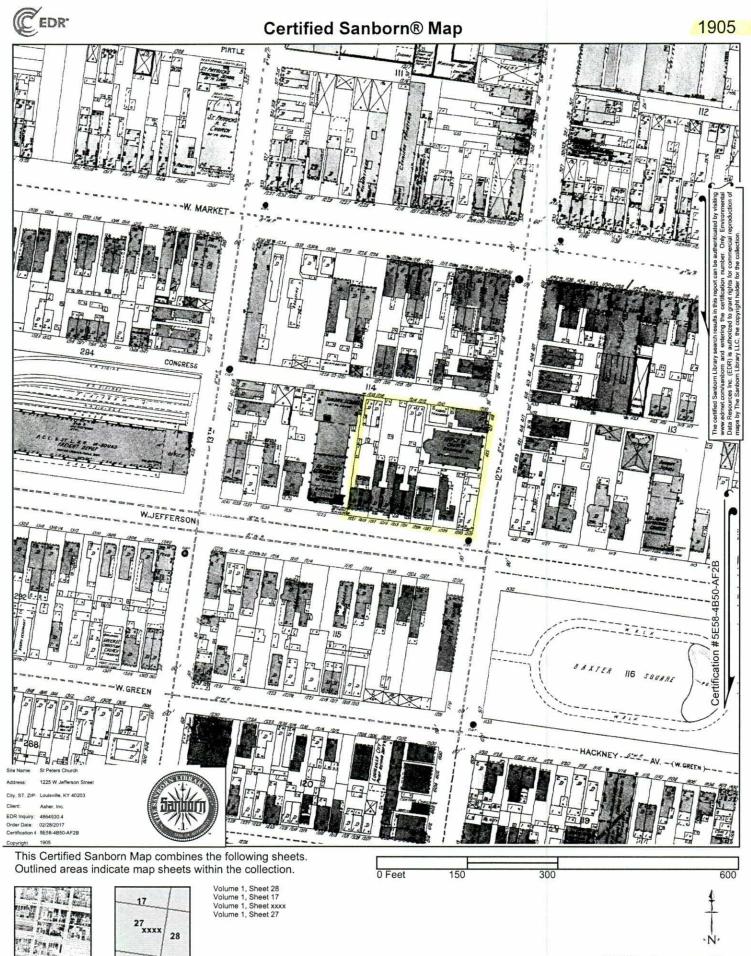


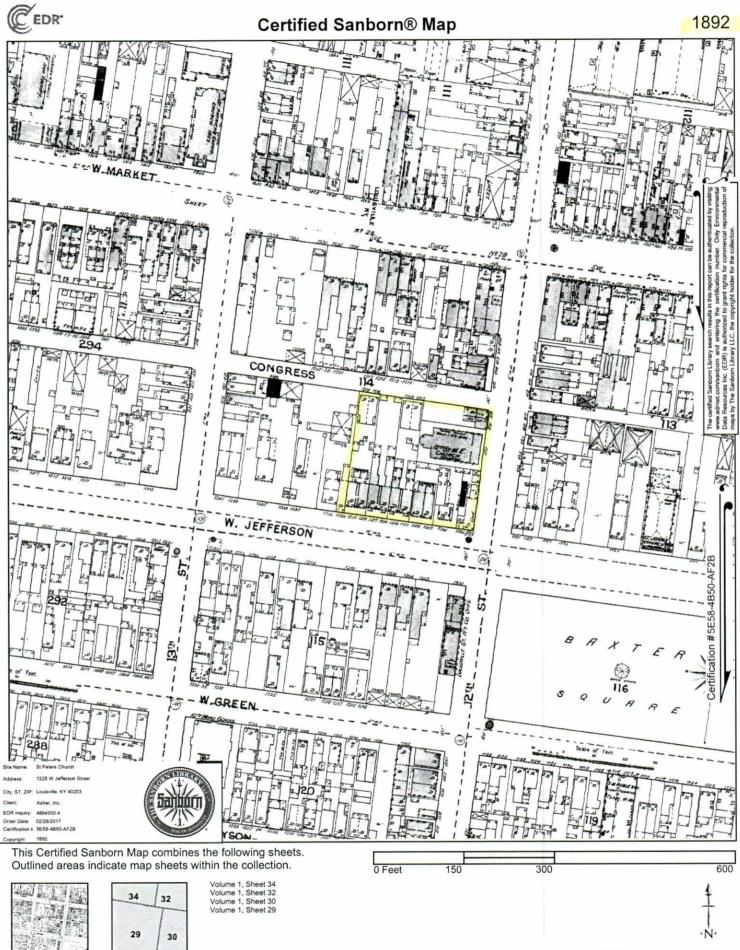


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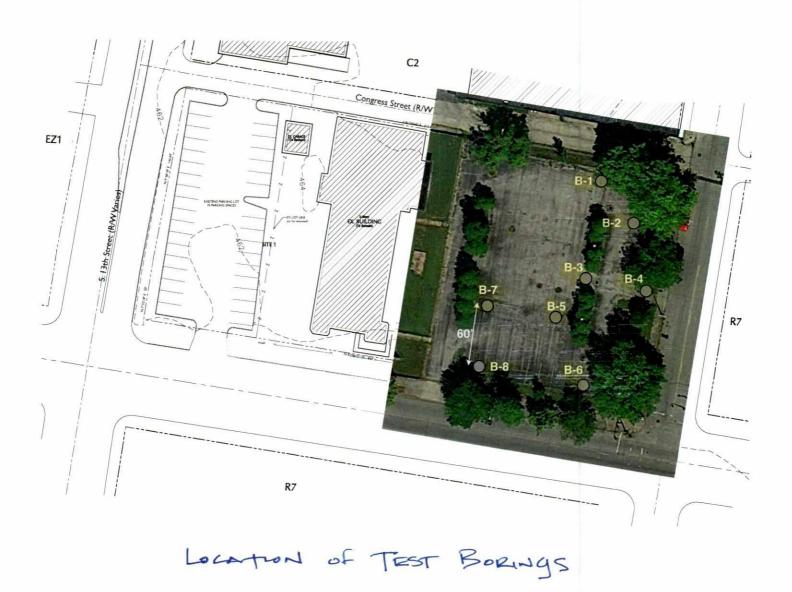




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The Village @ West Jefferson - Boring Plan

Louisville, KY



ASHER ENGINEERING March 7, 2017

Boring No.: 1

ELEV.:

Project:	The Village at West Jefferson					
Location:	W. Jefferson St. at 12th St.					
Client:	Kovert Hawkins Architects					

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.: 17-017

l (f	Elev feet)	Depth (feet)	Sample Number	SPT Blows / 6''	N	Percent Moisture	Description of Material
			1	2-2-3	5		2.5 in. asphalt, 6 in. crushed stone at surface Clayey Silt (ML) - soft, moist, brown
		5	2	2-3-3	6		same
		_	3	2-3-2	5		Clayey Sand (SP) - loose, moist, brown
			4	3-3-3	6		same
			5	4-6-8	14		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
		20					
		25 —					
No	otes:						

Boring No.: 2

ELEV.:

Project:	The Village at West Jefferson
Location:	W. Jefferson St. at 12th St.
Client:	Kovert Hawkins Architects

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.: 17-017

17 0

Date: March 6, 2017

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	-	1	3-4-5	9		2 in. asphalt, 10 in. crushed stone at surface Fill - firm clay soil, trace rock
	5	2	2-3-4	7		Clayey Silt (ML) - loose, moist, brown
		3	3-3-3	6		same
	10	4	3-4-4	8		Clayey Sand (SP) - loose, moist, brown
	15 —	5	4-5-6	11		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
	20					
Notes:	25					
Notes:						

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Boring No.: 3

ELEV.:

Project:	The Village at West Jefferson
Location:	W. Jefferson St. at 12th St.
Client:	Kovert Hawkins Architects

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.: 17-017

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	-	1	2-4-3	7		2.5 in. asphalt, 7 in. crushed stone at surface Fill - firm clay soil, trace rock and wood
	5	2	2-2-3	5		Fill - soft silty soil, wet, with rock and brick
		3	2-2-2	4		Silt (ML) - soft, wet, brown
	10	4	3-3-3	6		Clayey Sand (SP) - loose, moist, brown
	- 15 	5	5-6-9	15		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
	 20					
	25 —					
Notes:						

Boring No.: 4

ELEV.:

Project:	The Village at West Jefferson
Location:	W. Jefferson St. at 12th St.
Client:	Kovert Hawkins Architects

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.: 17-017

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6''	N	Percent Moisture	Description of Material
	-	1	2-2-2	4		2.5 in. asphalt, 8 in. crushed stone at surface Clayey Silt (ML) - soft, moist, brown
	5 —	2	2-3-3	6		same
	-	3	1-2-2	4		Clayey Sand (SP) - lose, moist, brown
	10	4	1-2-1	3		same
		5	3-4-5	9		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
	20					
	25 —					
Notes:						

Boring No.: 5

ELEV.:

Project:	The Village at West Jefferson							
Location:	W. Jefferson St. at 12th St.							
Client:	Kovert Hawkins Architects							

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.: 17-017

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6''	N	Percent Moisture	Description of Material
	-	1	5-6-7	13		2.5 in. asphalt, 6 in. crushed stone at surface Fill - silty clay soil and brick
	5	2	3-3-4	7		Clayey Silt (ML) - medium stiff, moist, brown
	_	3	3-4-4	8		same
	10	4	2-2-3	5		Silt (ML) - soft, wet, brown
		5	4-5-7	12		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
	20 —					
	25 —					
Notes:						

Boring No.: 6

ELEV.:

Project:	The Village at West Jefferson
Location:	W. Jefferson St. at 12th St.
Client:	Kovert Hawkins Architects

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.: 17-017

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6''	N	Percent Moisture	Description of Material
	-	1	2-3-3	5		2.5 in. asphalt, 6 in. crushed stone at surface Clayey Silt (ML) - loose, moist, brown
	5	2	3-3-3	6		same
		3	2-3-4	5		same
	10	4	2-3-3	6		same
		5	4-5-4	14		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
	20					
Notes:	25 —					

Boring No.: 7

ELEV.:

Project:	The Village at West Jefferson
Location:	W. Jefferson St. at 12th St.
Client:	Kovert Hawkins Architects

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.:

No.: 17-017

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6"	N	Percent Moisture	Description of Material
	-	1	3-3-3	6		3 in. asphalt, 5 in. crushed stone at surface Fill - sand, trace wood
	5	2	3-3-4	7		Fill - clayey silt soil, trace wood
		3	3-4-4	8		Clayey Silt (ML) - medium stif, moist, brown
	10	4	2-2-3	5		same, soft at 10 ft.
		5	2-3-3	6		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
	20					
	 25					
Notes:						

Boring No.: 8

ELEV .:

Project:	The Village at West Jefferson
Location:	W. Jefferson St. at 12th St.
Client:	Kovert Hawkins Architects

Asher Engineering

1021 South Floyd St. Louisville, KY 40203 (502) 589-0073

Project No.: 17-017

Elev (feet)	Depth (feet)	Sample Number	SPT Blows / 6''	N	Percent Moisture	Description of Material
	-	1	2-2-2	4		3 in. asphalt, 5 in. crushed stone at surface Fill - clay soil, sand, rock
	5	2	2-3-4	7		Clayey Silt (ML) - medium dense, moist, brown
	-	3	2-3-3	6		same
	10	4	2-3-4	7		same with trace sand
		5	5-4-5	9		Medium Coarse Sand (SP) - loose, moist, brown Terminated at 15 ft.
	20 —					
Notes:	25 —					

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The extent of demolition work is shown on drawings and specified herein.

- B. Demolition includes complete wrecking of structures and removal and disposal of demolished materials, as shown on drawings and herein specified.
- C. The Owner shall have the option of retaining any item removed. The Contractor shall deliver these items to the Owner's designated storage area. Any items not retained by the Owner shall be disposed of offsite by the Contractor.
- D. Some removed items are to salvaged for re-use. Drawings indicate extent of such work.
- E. The building was constructed with some materials containing asbestos. However, the Owner will remove and dispose of all such items by separate contract.

1.02 SUBMITTALS

A. Proposed methods and operations of building demolition to Architect for review prior to start of work.

PART 2 - PRODUCTS Not Applicable

Not Applicable

PART 3 - EXECUTION

3.01 PROJECT CONDITIONS

- A. Building and other structures to be demolished will be vacated and discontinued in use prior to start of work.
- B. The Owner assumes no responsibility for actual conditions of structures to be demolished.
- C. Conditions of the structure existing at time of inspection for bidding purposes will be maintained by Owner in so far as possible. However, variations within structure may occur by Owner's removal and salvage operations prior to start of demolition work.
- D. Pollution Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.
- E. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- F. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of work.
- G. Partial Removal: Items of salvable value to Contractor may be removed from structure as work progresses. Salvaged items must be transported from site as they are removed.
 - 1. Storage or sale of removed items on site will not be permitted.
 - 2. Store items noted on drawings and specified to be salvaged for use in the project, so as to prevent damage or deterioration.

- H. Disposal of Demolished Materials.
 - 1. Remove from site all debris, rubbish, and other materials resulting from demolition operations. Pay all fees related to removal and dumping.
 - 2. Burning of removed materials from demolished structures will not be permitted.
 - 3. All materials classified "Hazardous Waste" under definitions of Federal, State or Local government agencies must be disposed of according to their requirements. Provide copies of all dumping receipts.
- I. Use of explosives will not be permitted.
- J. Traffic
 - 1. Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, occupied areas, and other adjacent occupied or used facilities.
 - 2. Do not close or obstruct streets, walks or other occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- K. Protections
 - 1. Ensure safe passage of persons around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons. Provide protection in accordance with ANSI/NFPA 241.
 - 2. Erect temporary covered passageways as required by the Owner or authorities having jurisdiction.
- L. Repair any damage to property which is to remain in use, or that of any person, or persons on or off site caused by the demolition work without additional expense to Owner.

3.02 UTILITIES

- A. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations. Allow no interruption in service unless coordinated with Owner at least 72 hours in advance.
- B. Do no interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
- C. Disconnect and seal utilities serving each structure to be demolished, or interior area to be demolished, prior to start of demolition work.
- D. If utility service or other services to an occupied area (such as emergency power, heating, medical gas, air conditioning), are to be disconnected, provide temporary or alternative service to that area.
- E. Cap all utility lines terminated by the demolition work in a manner approved by the governmental authorities and utility companies having jurisdiction.
- F. Mark location of disconnected utilities. Identify and indicate capping location on project record documents.

3.03 FILLING

- A. Filling Basement and Voids:
 - 1. Completely fill below-grade areas and voids resulting from demolition of structures.
 - 2. Use satisfactory soil materials consisting of stone, gravel, and sand, free from debris, trash, frozen materials, roots and other organic matter.

- 3. Prior to placement of fill materials, ensure that areas to be filled are free of standing water, frost, frozen material, trash and debris.
- 4. Place fill materials in horizontal layers not exceeding 6" in loose depth. Compact each layer at optimum moisture content of fill material to a density equal to original adjacent ground, unless subsequent excavation for new work is required.
- 5. After fill replacement and compaction, grade surface to meet adjacent contours and to provide flow to surface drainage structures.

END OF SECTION 02060

SECTION 02110 - SITE CLEARING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to clear the site prior to excavation operation.
- B. Extent of site clearing is shown on drawings and/or included herein. Includes, but is not limited to:
 - 1. General requirements and preparation.
 - 2. Clearing and grubbing.
 - 3. Temporary erosion and sedimentary control measures.
 - 4. Topsoil stripping and stockpiling.
 - 5. Tree removal and protection.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 02060 - Building Demolition Section 02200 - Earthwork Section 02319 - Dewatering

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. Equipment used for clearing and grubbing operation shall be the contractor's option.

2.02 SOIL MATERIALS

A. Obtain all borrow materials from off-site when unsatisfactory quality or insufficient quantity of soil materials are not available on-site.

PART 3 - EXECUTION

3.01 GENERAL

- A. All debris will be removed from the Owner's property immediately. Burning on the site will be not be permitted. Care shall be taken to keep the nuisance of trash, noise and dust at a minimum.
- B. Protect existing site improvements to remain from damage during construction activities.
- C. Damage inflicted to any/all areas which are not to receive work, shall be repaired, or replaced by the Contractor as required by the Owner and Architect/Engineer.
- D. Do not close or obstruct streets, sidewalks, drives, or other adjacent occupied facilities without permission and approval of the Owner, Architect/Engineer, and Legal Authorities. Do not allow parking or storage of equipment or materials in existing parking areas. Provide alternates routes around closed or obstructed traffic ways, as approved by the Owner, Architect/Engineer, and Legal Authorities.
- E. When trees are shown to be removed, it shall mean grub out stumps and remove from property. Trees to be removed are indicated on the Drawings.

3.02 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

- B. Notify utility locator service for the area of the project before commencing any site clearing work. Arrange with utilities for proper shut-off of any utility operations and services as required.
- C. Do not commence any site clearing work until temporary erosion and sedimentary controls measures are in place.
- D. Locate and clearly mark all trees and vegetation which is to remain, be relocated, or removed.

3.03 CLEARING AND GRUBBING

- A. Clear the project sites of cinders, fill debris, concrete slabs, curbs, and retaining walls, bituminous and aggregate pavements, compacted aggregate bases, sidewalks, curbs, drainage structures and utility distribution system as required or indicated on the Drawings, including those shown on Mechanical and Electrical Drawings.
- B. Clearing shall consist of the removal and disposal of all encumbrance to a depth of at least twenty-four inches below finished earthwork grades or pavement subgrades, whichever is used in the area under construction.
- C. No foundation walls, footings, walks or slabs remaining from any former construction are to be used for new construction. Remove all existing walks, slabs, walls, footing, foundations, and other construction encountered within the property lines to their full depth.
- D. Grubbing shall consist of the removal of sod, trees, weeds and other vegetation, stones and rocks within various work areas.
- E. Rubbish deposits, if encountered, shall be removed to their full depth under areas that are to be paved or have structures on them. Replace deposits with concrete, No. 73B crushed stone or earth borrow compacted as specified in other sections of the Specifications.
- F. Fill depressions caused by clearing and grubbing activities with satisfactory soil material unless further excavation or earthwork is indicated.

3.04 EROSION AND SEDIMENTARY CONTROL MEASURES

- A. Provide erosion and sedimentary control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, in accordance with the agencies and authorities having jurisdiction.
- B. Inspect, repair, and maintain erosion and sedimentary control measures during construction until permanent vegetation has been properly established.
- C. Remove erosion and sedimentary control measures and restore and stabilize areas disturbed during removal.
- D. Install erosion control measures per plans.

3.05 TOPSOIL STRIPPING AND STOCKPILING

- A. Areas to be stripped shall first be scraped clean of all brush, weeds, sod, grass, roots, and other materials that will interfere with lawn maintenance, prior to stripping of topsoil.
- B. Topsoil shall be kept reasonably free from subsoil, debris and stones larger than 2 inches in diameter.

- C. Remove topsoil, to its entire depth, from the areas within lines 4 feet outside of foundation walls of buildings, from areas to be occupied by roads and asphalt paving areas. Areas to be regraded or subject to compaction by construction traffic shall have topsoil removed to a depth of 6 inches.
- D. Stored topsoil shall be stockpiled on-site to be used for finished grading. Locate stockpiled topsoil in designated or approved locations where it will not interfere with building or utility operations.
- E. Cover stockpiled topsoil to prevent windblown dust. Temporarily seed as required for erosion and sedimentary control.

3.06 TREE REMOVAL

- A. Remove all trees and stumps from area to be occupied by new buildings, roads, and surfaced areas. Removal of trees outside these areas shall only be done as noted on drawings and approved by the Architect.
- B. All brush, stumps, wood and other refuse from the trees shall be removed by digging, including the roots.

3.07 TREE PROTECTION

- A. The contractor shall be responsible for the protection of tops, trunks and roots of existing trees on project site that are to remain.
- B. Existing trees subject to construction damage shall be fenced to the limits of their branch spread or otherwise protected before any work is started; remove fencing when complete. Remove interfering branches without injury to trunks and cover scars with tree paint. Do not permit heavy equipment or stockpiles within branch spread.
- C. In general, do not excavate within the tree protection zone or within the branch spread of trees. Where excavating, fill or grading is required within the branch spread of trees that are to remain, the work shall be performed as follows:
 - 1. Trenching: When trenching occurs around trees to remain, the tree roots shall be tunneled under or around the roots by careful hand digging and without injury to the roots.
- D. Install tree protection fencing per landscape plans.

END OF SECTION 02110

SECTION 02200 - EARTHWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Work generally includes, but not by way of limitation, the following:
 - 1. The extent of earthwork is shown on drawings.
 - 2. Engineered fill for building support.
 - 3. Preparation of subgrade for foundations and slab-on-grade.
 - 4. Backfilling of trenches for utilities and services.
 - 5. Excavation and backfilling for building.
 - 6. Cut and fill of project site.
 - 7. Computer generated cut and fill calculations.
 - 8. Subgrade shall be graded to drain during the entire construction period.
 - 9. Geotextile fabric to act for soil stabilization, soil separation, weed barrier, or moisture barrier in a variety of earthwork, sitework or landscape applications.
- B. Contractor is responsible for implementing any proper means and methods necessary to complete work of this section based on normal seasonal environmental conditions.
- C. <u>No additional compensation will be considered for contractor's assumption that work would be</u> <u>completed under ideal environmental conditions.</u>
- D. Unless otherwise allowed by the Architect, it shall be assumed that all excavated rock shall be removed from the site and disposed of by the Contractor.
- E. Unless otherwise directed by the Architect, it shall be assumed that all needed materials shall be brought in from offsite and supplied and installed by the Contractor.
- F. Unless otherwise directed by the Architect, it shall be assumed that all excess materials shall be removed from the site and hauled off and disposed of offsite by the Contractor.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- Section 01400 Quality Control
- Section 02110 Site Clearing
- Division 15 Plumbing Excavation
- Division 16 Electrical Excavation

1.03 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Testing and Inspection Service:
 - 1. Contractor will provide a Soils Engineer, as acceptable to the Architect, for testing and inspection service for quality control testing during all earthwork operation.
 - 2. See Section 1400 Quality Control.
 - 3. If not already covered by another Section of these Specifications, submit Soils Engineer's credentials for acceptance.
- C. Soils Engineer representative must be present to observe and perform tests at all times any soil work or earthwork activities are in progress:

- 1. Determine suitability of materials for compacted fill, backfill and engineered fill.
- 2. Determine preparation and placing of materials for fill, backfill and engineered fill.
- 3. Determine maximum density of optimum moisture content for placing and compacting materials.
- 4. Perform necessary field density tests to insure adequate compaction for fill, backfill and engineered fill, for each compacted layer of fill.
- 5. Perform necessary field inspection of different phases of earthwork.
- 6. Perform necessary field inspection for borrow pits.
- D. Surveyor shall verify property lines, right-of-way; establish correct levels, lines and grades; completely layout work required.

1.04 <u>SUBMITTALS</u>

A. Written copy of test reports of all tests to the Architect within 48 hours.

1.05 SITE CONDITIONS

- A. Site Information:
 - 1. Data on indicated subsurface conditions are not intended as representations of warranties of accuracy of continuity between soil borings.
 - 2. It is expressly understood that neither the Owner nor its consultants will be responsible for interpretations or conclusions drawn by the Contractor. Data is made available solely for convenience of Contractor.
 - 3. Additional test boring and other exploratory operations may be made by Contractor at no cost to the Owner.
- B. Existing Utilities:
 - 1. Locate existing under ground utilities in areas of work. If utilities are to remain in place, provide adequate means of protection during earthwork operations.
 - 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions and notify Architect. Cooperate with the Owner and utility companies in keeping respective services and facilities in operation.
 - 3. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by Architect and then only after acceptable temporary utility services have been provided.
 - 4. Demolish and completely remove from Owner's property existing under ground utilities indicated to be removed or required to be removed for completion of the Work. Coordinate with utility companies for shut-off services if lines are active.
- C. Explosives:
 - 1. Explosives will not be permitted.
- D. Cut and Fill Material Quantities:
 - 1. It is expressly understood that neither the Owner, Architect or their consultants will be responsible for quantities of cut or fill required to achieve the final grades indicated on the drawings.
 - 2. Neither the Owner, Architect or their consultants will be responsible for the type of material existing on the site or its quality for use as a particular type of fill.
 - 3. The contractor is responsible for reviewing existing conditions and proposed design in detail as he determines sufficient for calculating the extent of the work and materials required.
 - 4. Contractor will be allowed to dig test holes during bidding. A minimum of 24 hours notice to owner of the anticipated locations and depths will be required.
 - 5. Contractor shall <u>not</u> assume a "balanced" project of cut and fill quantities.
- E. The Contractor shall consider the timing required for all earthwork for the entire project.

He shall include in his bid all work and costs associated with the proper protection, procedures and materials required for the weather and environmental conditions for the time of year the work is to occur. No additional costs will be borne by the Owner, Architect or their consultants for failure by the Contractor to include these costs in the bid.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

A. Fill:

- 1. Earth, free of vegetation, waste, humus, rocks, boulders, stones, bricks, batts, plaster, mortar or other debris.
- 2. Broken concrete, block or brick shall not be used for fill.
- 3. Rocks larger than 3 inches in any dimension shall not be used within subgrade.
- 4. Plasticity index (PI) less than 35.
- 5. Maximum dry density according to the Standard Proctor Compaction Test, minimum 100 pcf. Modified Proctor Compaction Test may be performed in lieu of Standard Proctor Compaction Test.
- B. Mass Backfill:
 - 1. Suitable earth removed from the excavation, free of rocks, boulders, stones larger than 2 inches or other building materials debris.
 - 2. Brown sandy clays may be used for backfill around exterior of foundations.
 - 3. Topsoil and soil containing decomposed organic materials shall be considered suitable for topsoil fill material only.
 - 4. Aeration of some backfill may be required for compaction.
 - 5. Plasticity index (PI) less than 35.
 - 6. Maximum dry density according to the standard Proctor compaction test, minimum 100 pcf. Modified Proctor Compaction Test may be performed in lieu of Standard Proctor Compaction Test.
- C. Trench Backfill:
 - 1. Sand for all typical locations.
 - 2. Onsite soil may be used for fill from 12 inches above pipes in grassy areas in lieu of sand. Intent is to not have sand or gravel bedding stone visible at the top of the excavation in grassy areas.
- D. Engineered Fill:
 - 1. Cohesive and stable earth as described above, suitable for bearing.
- E. Drainage Fill / Granular Fill:
 - 1. Washed, evenly graded mixture of crushed stone, crushed gravel, uncrushed gravel or river gravel.
 - 2. Contain maximum 5% by weights, passing No. 8 sieve, 100% passing 1 inch sieve.
 - 3. Sand will not be an acceptable drainage fill/granular fill material.
- F. Top Soil:
 - 1. Natural, fertile, agricultural soil, capable of sustaining vigorous plant and lawn growth.
 - 2. Uniform composition throughout, without admixture of subsoil.
 - 3. Free of stones, lumps, clods, sod, live plants and their roots, sticks and other extraneous matter.

2.02 <u>GEOTEXTILE FABRIC</u>

A. Equal to: "Propex GeoSynthetics", Geotex 200ST.

- B. Description:
 - 1. Woven slit film geotextile fabric.

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- 2. Individual films shall be woven together to provide dimensional stability relative to each other.
- 3. Resistant to ultraviolet degradation and to biological and chemical environments normally present in soils and subsurface conditions.
- C. Quality Control and Performance Standards:
 - 1. Tensile Strength: 200 lbs (ASTM D-4632).
 - 2. Elongation: 12% (ASTM D-4632).
 - 3. Puncture: 90 lbs. (ASTM D-4833).
 - 4. CBR Puncture: 700 lbs. (ASTM D-6241).
 - 5. Mullen Burst: 400 psi (ASTM D-3786).
 - 6. Trapezoidal Tear: 75 lbs. (ASTM D-4533).
 - 7. UV Resistance: 70% retained at 500 hrs (ASTM D-4355).
 - 8. Apparent Opening Size: 40 US Standard Sieve (ASTM D-4751).
 - 9. Permittivity:

- .05 sec (ASTM D-4491).
- 10. Water Flow Rate: 4 gpm/ft2 (ASTM D-4491).

PART 3 - EXECUTION

3.01 INSPECTION

- A. Contractor shall thoroughly review the existing conditions, prior to bidding or starting earthwork. This includes topography, soil materials, site access, etc. and the schedule requirements to complete the work of this section without delaying other trades or the overall project schedule.
- B. Review conditions of property adjacent to the site. Do not alter storm drainage, access, utilities etc. to the adjacent property without prior approval of Architect and Owner.

3.02 PROTECTION

A. Maintain excavation banks and pit walls in a safe and stable conditions.

- B. Provide sheet piling, shoring and bracing as necessary to maintain excavation banks and pits, and for the protection of adjoining property, structures, pits and footings.
- C. Keep open excavation free of water, both surface and subterranean by use of pumps and earth damming around such excavations to throw surface water away from the excavation of any structure.
- D. Protect open excavation by lighted barricades or railings to prevent injury to personnel.
- E. Protect existing utilities, roads, pavement and structures.

3.03 PREPARATION

A. Clearing:

- 1. Clear areas as specified in Section 02110.
- 2. Remove topsoil to its full depth at construction and within grading limits.
- 3. Stock topsoil for use in finish grading operation. Do not use for fill.
- B. Provide grade stakes; maintain lines and grades. Stakes no more than 25 ft. apart along roadways, and 50 ft. maximum along drives and paved areas.
- C. Disk to depth of 6 inches below subgrade and compact to required density prior to proof-rolling.
- D. Proofroll stripped subgrade with rubber tired roller or other means approved by Architect.

- E. Clean out unsuitable pockets and fill with earth fill, compacted.
- F. Disc or blade subgrade until uniform, and compact to specified density.
- G. Do not place fill materials until subgrade excavation has been inspected and approved by Soils Engineer and Architect.

3.04 EXCAVATION

- A. Excavate true to line and grade, level at bottom.
- B. Excavate to suitable bearing subsoil as determined by Soils Engineer.
- C. Excavations shall be to the dimensions indicated plus sufficient space to permit erection of forms, shoring, masonry, and foundations and excavation inspections.
- D. Excavation below slabs and paving shall be sufficient to permit placement of subbase materials.
- E. Foundations:
 - 1. If suitable bearing is not encountered at the depth indicated on drawings for foundations, immediately notify the Architect.
 - 2. Do not proceed further until instructions are given by the Architect and required tests are completed.
 - 3. Under no conditions are footings to be placed on soft earth or fill.
- F. Footing Trenches:
 - 1. Where soil conditions permit, footing trenches may be excavated to the exact dimension of the concrete, and side forms omitted.
 - 2. Place footings and foundations upon undisturbed, firm bottoms.
 - 3. Fill with lean concrete any excess cut under footings and foundations.
- G. Provide shoring or piling as required to protect excavation banks.

3.05 ROCK EXCAVATION

- A. Definition:
 - 1. Rock is defined as stone or hard shale in original ledge, boulders over 1/2 cu. yard in volume, masonry or concrete that cannot be broken and removed by normal job equipment (power shovel 1/2 yard capacity, scoops, bulldozers), without the use of explosives or drills.
 - 2. This classification does not include material such as loose rock, concrete or other materials that can be removed by means other than drilling and blasting.
 - 3. Boulders shall be removed from excavation and stockpiled for removal from site.
- B. Measurement:
 - 1. Rock shall be stripped for measurement before excavating, and no rock excavated or loosened before measurement will be allowed or paid for as rock.
 - 2. Measurement and payment, shall be by the number of cubic yards required to bring excavation to required surface of grade shown on drawings.
 - 3. Owner may adjust grades should excessive rock be encountered.
- C. Rock Excavation Space Allowance:
 - 1. 18 inches outside wall lines of building, or outside of concrete work for which forms are required.
 - 2. 4 inches below and 12 inches each side of underground pipes.

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- 3. Outside dimensions of concrete work for which no forms are required.
- D. Payment:
 - 1. No additional compensation will be made for rock removal identified in the Geotechnical Report, using a reasonable straight interpolation of the rock elevation between borings. For purposes of rock removal, "refusal" in the boring logs is assumed to be rock.
 - 2. Geotechnical Report indicates rock will be encountered during construction.
 - 3. Contractor shall include in the Lump Sum Base Bid or applicable Alternate Bids, the cost of rock removal required for completion of this work throughout the entire site, based upon the Geotechnical Report.
 - 4. Bidders may visit the site and make additional underground investigations at their discretion. Coordinate schedule and locations with Architect at least 24 hours in advance.
 - 5. For rock encountered that could not have been reasonably foreseen based upon the Geotechnical Report, do not proceed without written permission from the Architect. If approved, payment will be made upon a unit price basis, or upon a time and material basis, whichever is less.
 - 6. Contractor shall submit timesheets, material records and receipts, and any other supportive data requested by the Architect for determination of final approved price.
- E. Explosives:
 - 1. Explosives will not be permitted.

3.06 FILLING AND BACKFILLING

- A. Fills shall be formed of satisfactory materials placed in successive horizontal layers of approximately 6 inches in loose depth for the full width of the cross section.
- B. Proof roll all areas to receive fill.
- C. Where objectionable subgrade material is encountered and removed, fill excavated area to original ground level with suitable fill as specified, and compacted as required before starting filling operation.
- D. All material entering the fill shall be free of organic matter such as leaves, grass, roots and other objectionable material.
- E. Sprinkling:
 - 1. Use sprinkling wagons, pressure distributors and other approved equipment that will sufficiently distribute the water.
 - 2. Sufficient equipment to furnish the required water shall be available at all times.
- F. Take samples at frequent intervals of all fill materials for testing, both before and after placement and compaction. From these tests, corrections, adjustments and modifications of methods, materials and moisture content will be made to construct the fill.
- G. Construction of filled areas:
 - 1. Starting layers shall be placed in the deepest portion of the fill.
 - 2. Each lift shall be disked or treated by some other mechanical means as to insure the breaking up of any existing lumps and clods.
 - 3. As placement progresses, layers shall be constructed approximately parallel to the finished grade line.
- H. The Contractor shall be responsible for the stability of fills made under the contract and shall replace any portion which has become displaced due to carelessness or negligence on the part of the Contractor.

- I. Heavy equipment for spreading fill shall not be used closer to structures that a distance equal to the height of backfill above top of footing.
- J. Backfilling shall not be done until walls are braced or shored.
- K. If fill is to be provided on both sides of walls, fill on both sides at same time.
- L. Drainage fill under floor slabs on grade shall be placed to indicated depths not less than 4 inches.
- M. Fill excess cuts under slabs with drainage fill and thoroughly compact.
- N. Dispose of all excess fill offsite.
- O. Provide acceptable fill from off site if necessary to meet finish grades indicated, at no additional cost to Owner.

3.07 <u>COMPACTION</u>

- A. Fill areas shall be compacted using equipment capable of compacting each lift its full depth. Moisture during compaction operations shall be maintained at optimum content.
- B. Compacting equipment shall be approved equipment of such design, weight and quantity to obtain the required density in accordance with soil compaction specification.
- C. Add moisture or aerate material as necessary to achieve optimum moisture content.
- D. Compaction operations shall be continued until the fill is compacted to not less than the following percent of the maximum dry density as determined in accordance with ASTM D698.
 - 1. 100% in fill areas supporting footings.
 - 2. 95% in non-load bearing areas within building lines.
 - 3. 95% in fill areas under paved areas.
 - 4. 85% in landscaped areas.
- E. Any areas inaccessible to a roller shall be consolidated and compacted by mechanical tampers.
- F. Operate equipment so that hardpan, cemented gravel, clay, or other chunky soil material will be broken up into small particles and become incorporated with the material in the layer.
- G. Cut areas: Disk to 6 inches below subgrade and compact to 95% of maximum dry density at optimum moisture content as determined by ASTM D698.
- H. Compaction by flooding is not acceptable.
- I. Sealing: At end of each work day of filling and compaction operation, roll surface with smooth tired vehicle to leave smooth surfaced sealed to shed all water.

3.08 GRADING

A. Furnish, operate and maintain such equipment as is necessary to control uniform layers, sections and smoothness of grade for maximum compaction and drainage.

- B. Rough Grading:
 - 1. Even grade to elevations 6 inches below finish grade topsoil elevations indicated.
 - 2. Protect all constructed items during grading operations, and repair if damaged.
 - 3. All areas in the project including excavated and filled sections and adjacent transition areas shall be reasonably smooth, compacted and free from irregular surface changes.
 - 4. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified.
 - 5. The finished subgrade surface generally shall be not more than 0.10 feet above or below the established grade or approved cross-section, with due allowance for topsoil and sod where required.
 - 6. The tolerance for areas within 120 feet of the buildings shall not exceed 0.10 feet above or below the established subgrade.
 - 7. All ditches, swales and gutters shall be finished to drain readily.
 - 8. Unless otherwise indicated on the drawings, the subgrade shall be evenly sloped to provide drainage away from the building walls in all directions at a grade not less than 1/2 inch per foot.
 - 9. Provide roundings at top and bottom of banks and at other breaks in grade.
- C. Protection:
 - 1. Protect newly graded areas from the action of the elements.
 - 2. Any settlement or washing that occur prior to acceptance of the work shall be repaired, and grades re-established to the required elevations and slopes.
 - 3. Fill to required subgrade levels any areas where settlement occurs.
- D. Finish Grading:
 - 1. Proceed to finish elevations indicated.
 - 2. Rake subsoil clean of stones and debris. Scarify to depth of 3 inches.
 - 3. Spread stockpile topsoil over prepared subgrade to minimum depth of 6 inches, and rolled until suitable for seeding.
 - 4. Maintain surfaces and replace additional topsoil necessary to repair erosion.
- E. Continued Drainage:
 - 1. All subgrade shall be graded to continuously drain during all phases and entire duration of construction and construction activities.
 - 2. Contractor shall be held responsible for any/all detrimental site, soil and subsurface conditions created or altered as a result of improper drainage of soils and subgrade.

3.09 QUALITY CONTROL

- A. Tests of Earthwork for Paved Areas and Slabs on Grade:
 - 1. An average of one test per 6 inch lift of each 5,000 square feet area will be required.
 - 2. The exact number of tests will depend on the weather, and be at the discretion of the Soil Engineer and approved by the Architect.
 - 3. Testing firms shall test and approve all material use in fill operation.
 - 4. Should tests indicate the required density was not attained, Contractor shall remove fill and/or backfill to depths required and as determined by the test and repeat operations until said density is attained.
- B. Quality Control of Footings:
 - 1. Footing excavation bases will be inspected by Soils Engineer.
 - 2. If soft pockets are encountered, the undesirable material shall be removed.
- C. The Architect upon the recommendation of the Testing Laboratory, will have the power of rejection of materials, equipment or operating procedures which are not suitable to produce the results specified.

D. The Contractor shall cooperate with the Testing Laboratory and shall allow the Soils Engineer ample time to conduct tests. Operation of equipment shall be discontinued when the operation interferes with testing.

SUBMITTAL CHECK LIST

- 1. Qualifications of Soils Engineer.
- 2. Test results and reports of Soils Engineer/Testing Laboratory.

END OF SECTION 02200

SECTION 02280 - TERMITE CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment, special tools, supervision and services required to provide termite treatment as specified herein.

1.02 QUALITY ASSURANCE

- A. Applicators Qualifications:
 - 1. Performed by applicator licensed in the State of application.
 - 2. Minimum three (3) year's experience.

1.03 <u>SUBMITTALS</u>

- A. Manufacturer's Literature.
 - 1. Published data on product solution composition and use.
 - 2. Mixing and application instructions.
 - 3. Material Safety and Data Sheets (MSDS).
- B. Written warranty and guarantee.

1.04 WARRANTY

- A. Provide written warranty and insured guarantee.
- B. Effectiveness of treatment guaranteed for not less than five (5) years.
- C. If any termite activity is discovered within the warranty period, the Contractor shall re-treat structure and repair or replace all areas of damage caused, without any expense to the Owner.
- D. Guarantee to prevent and control infestations by subterranean termite species of genera:
 - 1. Coptotermes.
 - 2. Heterotermes.
 - 3. Reticulitermes.
 - 4. Zootermopsis.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Provide one of the following approved products:
 - 1. "FMC Corporation"; Prevail FT.
 - 2. "FMC Corporation"; Talstar P.
 - 3. "FMC Corporation"; Baseline Pretreat Termiticide.
 - 4. "Masterline"; Bifenthrin 7.9.
 - 5. "Nisus Corporation"; Bora-Care.
- B. Description:
 - 1. Termiticide, insecticide, fungicide.
 - 2. Water-based or borate-based chemical emulsion.
 - 3. Safe for use on wood, concrete, plastics, metals, flashings, rigid insulations, and earth.
 - 4. Shall provide a continuous barrier that termites cannot cross and eliminate wood as a food source.

PART 3 - EXECUTION

3.01 <u>APPLICATION</u>

- A. Areas of Treatment:
 - 1. Treat entire under-slab area of building a minimum of two inches beyond the exterior building line.
 - 2. Treat entire interior surface of all foundation walls, grade beams, crawlspaces and basement walls.
 - 3. Treat all areas of building expansion joints and both sides of planned interior partitions.
 - 4. Treat all pipe, conduit and plumbing penetrations through the exterior walls.
 - 5. Treat all pipe, conduit and plumbing penetrations through the floor slab.
- B. Rate of Application:
 - 1. Apply treatment in strict accordance with the manufacturer's published rates of application.
 - 2. Vary rates of application at each condition of use as per the manufacturer.

SUBMITTAL CHECK LIST

- 1. Manufacturer's Literature.
- 2. Written warranty and guarantee.

END OF SECTION 02280

SECTION 02370 - EROSION CONTROL

PART 1 - GENERAL

1.01 RULE 5 SUBMITTAL

The Architect, Owner, or a consultant of the Architect or Owner, will be responsible for: A. Preparation of Erosion Control Plan and details to meet the requirements of MSD.

B. Submittal of Erosion Control Plan and details to MSD for review and approval.

1.02 WORK INCLUDED

- A. Implementation of all work included in the approved Erosion Control Plan to meet the requirements of MSD.
- B. Contact MSD for review and approval for commencement of site work activities.
- C. Filing of any and all required documents and notices with MSD prior to the commencement of site work activities.
- D. Publication of required notices prior to the commencement of site work activities.
- E. Furnish and install erosion control materials and procedures as required by MSD.
- F. Maintain the erosion control systems and procedures throughout the project, including corrections of any and all measures following rain, storms or other inclement weather.
- G. Notify Architect when scope of all site work and erosion control work is complete for filing of the Notification of Completion (NOC) with MSD.
- 1.03 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02110 - Site Clearing Section 02200 - Earthwork

1.04 <u>SUBMITTALS</u>

A. Manufacturer's product data and cutsheets for all products listed herein.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Quick Growing Grasses:
 - 1. Wheat, rye or oats.
 - 2. Integrally seeded stabilization mats.
- B. Straw Bales:
 - 1. Free of weed seed.
 - 2. 2 inch x 2 inch x 48 inch wood stakes.
- C. Silt Fence:
 - 1. Geotextile fabric and staking system.
- D. Rock Check Dam:
 - 1. Crushed limestone.

- E. Engineered Fill:
 - 1. Cohesive and stable earth as described above, suitable for bearing.
- F. Temporary Mulch:
 - 1. Loose straw crimped into soil.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Thoroughly review existing site conditions prior to bidding or starting earthwork.
- B. Review conditions of property adjacent to the site. Do not alter storm drainage, access, utilities etc. to the adjacent property without prior approval of Architect and Owner.

3.02 IMPLEMENTATION

- A. Maintain excavation banks and pit walls in a safe and stable condition.
- B. Maintain temporary erosion control systems installed to control siltation at all times throughout the work. Provide maintenance or additional work within 48 hours of notification by local IDNR official.
- C. Install permanent erosion control measures as soon as possible.
- D. Protect open excavation by lighted barricades or railings to prevent injury to personnel.

SUBMITTAL CHECK LIST

1. Manufacturer's product data and cutsheets.

END OF SECTION 02370

SECTION 02510 - ASPHALT CONCRETE PAVING

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the asphalt concrete paving work indicated, noted, and detailed on the drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02200 - Earthwork Section 02720 - Storm Sewage Systems. Division 3 - Concrete Paving and Curbs.

1.03 QUALITY ASSURANCE

- A. Provide final surface of uniform texture conforming to required grades and cross sections.
- B. Surface smoothness, when tested with 10 ft. Straight-edge:
 - 1. Base: 1/4 inch in 10 ft. maximum.
 - 2. Binder Course: 1/4 inch in 10 ft. maximum.
 - 3. Surface Course: 1/8 inch in 10 ft. maximum.
- C. Manufacturer's Qualifications:
 - 1. Registered with the Kentucky Transportation Cabinet as an approved supplier.
- D. Regulatory Requirements:
 - 1. Comply with materials, workmanship, and other applicable requirements of the Kentucky Transportation Cabinet Standard Specifications for asphalt paving work.

1.04 <u>REFERENCES</u>

- A. Publications of the following institutes, associations, societies, and agencies are referred to this Section.
 - 1. Kentucky Department of Highways, Standards Specifications for Road and Bridge Construction, Latest Edition, KDH.
 - 2. American Society for Testing and Materials, ASTM.

1.05 SUBMITTALS

- A. Prior to starting any asphalt concrete paving work, prepare a preliminary Job-Mix formula for all asphalt paving to be used in this project.
 - 1. Submit preliminary Job-Mix formula to the Architect for review a minimum of 15 days before asphalt concrete paving is required.

1.06 SITE CONDITIONS

- A. Ambient Air Temperature (Degrees Fahrenheit).
 - 1. Base/Binder Course 35°F minimum.
 - 2. Surface Course 45°F minimum.
 - 3. Marking Paint 40°F 95°F.
- B. No binder course or surface course shall be applied to wet surfaces. Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure.
- C. Lane marking paint shall only be applied to clean, dry surfaces.

D. Surface course shall <u>NOT</u> be applied after October 15 or before May 1.

PART 2 - PRODUCTS

- 2.01 <u>MATERIALS</u>
 - A. General:
 - 1. Use locally available materials and gradations which exhibit a satisfactory record of previous installations.
 - B. Dense Graded Aggregate (DGA):
 - 1. Graded aggregate and water mixed.
 - 2. Meet requirements of KDH Standard Specification, Section 303.
 - C. Course Aggregate:
 - 1. Sound, angular crushed stone, crushed gravel, or cured crushed blast-furnace slag.
 - 2. ASTM D692.
 - 3. Meet requirements of KDH Standard Specification, Section 401.
 - D. Fine Aggregate:
 - 1. Sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.
 - 2. ASTM D1073.
 - 3. Meet requirement of KDH Standard Specification; Section 407.
 - G. Asphalt Cement:
 - 1. Prepared by the refining of petroleum.
 - 2. Viscosity grade: PG 64-22.
 - 3. AASHTO M 320 or AASHTO MP 1a.
 - 4. Meet requirements of KDH Standard Specification, Section 806.
 - H. Lane Marking Paint:
 - 1. Equal to:
 - a. "MPI"; #32 Alkyd Traffic Marking Paint.
 - b. "MPI"; #97 Latex Traffic Marking Paint (only where alkyd paints are not permitted).
 - 2. Factory Mixed, quick drying and non-bleeding alkyd oil based paint.
 - 3. FS TT-P-115, Type III.
 - 4. Color:
 - a. White (typical striping locations).
 - b. Yellow (where indicated on Drawings).
 - c. ADA blue at all handicap spaces and access aisles.

2.02 TABLE OF COMPOSITION LIMITS

Sieve Size	Metric Size	Percent Pass	Percent Passing by Weight	
		Binder	<u>Surface</u>	
1 inch	25.0 mm	100	100	
3/4 inch	19.0 mm	90 - 95	100	
1/2 inch	12.5 mm	70 - 92	100	
3/8 inch	9.50 mm	50 - 76	85 - 95	
No. 4	4.75 mm	35 - 40	55 - 70	
No. 8	2.36 mm	18 - 45	30 - 65	
No. 16	1.18 mm	10 - 36	15 - 50	
No. 30	600 µm	6 - 26	8 - 40	

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No. 50	300 µm	2 - 18	3 - 25
No. 100	150 μm	0 - 11	0 - 15
No. 200	75 µm	0 - 5	0 - 4
Asphalt Co	ntent	4.0 - 6.0	4.5 - 6.5
Course Age	gregate Size	No. 8 & 11	No. 11
Fine Aggre	gate	L.S. Sand	Sand

PART 3 - EXECUTION

3.01 <u>GENERAL</u>

- A. Subgrade shall be proof-rolled using pneumatic tired roller capable of exerting minimum 90 psi pressure uniformly over the subgrade surface.
 - 1. Proof-rolling shall provide two complete coverages.
 - 2. Remove and replace soft spots with stable material, compact and re-proof.
 - 3. Do not proof-roll wet or saturated surfaces.
- B. Proceed with paving only after all unsatisfactory subsurface conditions have been corrected.
- C. All materials shall be spread using approved spreading equipment. Tailgating of aggregates directly onto subgrades will not be acceptable.
 - 1. Asphalt pavers shall be self-propelled with receiving hopper of sufficient capacity to provide a uniform spreading operation.
 - 2. Rollers shall be steel wheeled weighing 10 ton or three wheeled rollers with bearing of 300 pounds per linear inch width of rear wheels.
- D. Contractor shall have on hand at the site prior to paving operation all necessary portable and hand tools and one stand-by roller.

3.02 COMPACTION

- A. Subgrade and compacted base courses shall be compacted to 95% of maximum dry density in accordance with ASTM D698.
 - 1. Each lift of aggregate base shall be compacted to density specified above.
 - 2. Soft spots found during proof-rolling which are replaced with fill material shall be compacted to density specified above.

3.03 SURFACE PREPARATION

A. Remove loose material from base surface immediately before applying prime coat.

3.04 SPREADING AND ROLLING

- A. Base Course, Compacted Stone Aggregates, and DGA:
 - 1. Spread and compact in separate lifts, maximum 4 inches each, see details for depths.
 - 2. Extend lower lift 4 inches beyond next lift.
- B. Binder Course:
 - 1. Spread and roll to minimum finish depths indicate on details.
 - 2. Spread mixture at minimum temperature of 250°F.
- C. Surface Course:
 - 1. Spread and roll to minimum finish depths indicated on details.
 - 2. Finish installation shall be true to line and grade and within 1/2 inches of true elevation.

3.05 STRIPING PAINT

- A. Cleaning: Sweep and clean surface to eliminate loose materials and dust.
- B. Striping: Use alkyd-oil traffic lane-marking paint, factory-mixed, quick-drying, and non-bleeding.
- C. Apply paint with mechanical equipment to produce uniform straight edges. Apply in 2 coats at manufacturer's recommended rates to form 4 inches minimum width lines.
 - D. Handicap parking spaces shall be white symbol on an ADA Blue background.

3.06 DENSITY TESTS

- A. Take density tests at each lift as directed by the Architect.
- B. Tests shall be made by a soils engineer approved by the Architect.
 - 1. A total of at least four (4) tests will be required at various times and locations for subgrade and base course for paved areas.
 - 2. Provide results of each test to the Architect within 72 hours after tests are made.
 - 3. Include cost of tests as outlined above in the contract amount.

SUBMITTAL CHECK LIST

- 1. Asphalt Paving Mix Formula.
- 2. Density Test Results.

SECTION 02515 - ASPHALT PAVEMENT REPAIR AND RESURFACING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the asphalt pavement repair and/or resurfacing work indicated, noted, and detailed on the drawings and specified herein.

1.02 QUALITY ASSURANCE

- A. Provide final surface of uniform texture conforming to required grades and cross sections.
- B. Surface smoothness, when tested with 10 ft. Straight-edge:
 - 1. Base Course: 1/4" in 10 ft. maximum.
 - 2. Surface Course: 1/8" in 10 ft. maximum.

1.03 <u>REFERENCES</u>

- A. Publications of the following institutes, associations, societies, and agencies are referred to this Section.
 - 1. Indiana Department of Highways, Standards Specifications, Latest Edition, IDH.
 - 2. American Society for Testing and Materials, ASTM.

1.04 <u>SUBMITTALS</u>

- A. Asphalt pavement Job-Mix formula a minimum of 15 days before asphalt paving is required.
- B. Sealcoating Technical Data.
- C. Joint and Crack Filler Technical Data.

1.05 SITE CONDITIONS

- A. Minimum Ambient Air Temperature (Degrees Fahrenheit).
 - 1. Base Course: 35°F
 - 2. Surface Course: 45°F
 - 3. Prime and Tack Coats Same as with which work to be included.
- B. No prime/tack coats, base or surface courses shall be applied to wet surfaces.
- C. Surface course shall <u>NOT</u> be applied before May 1 or after October 15.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

A. General:

Use locally available materials and gradations which exhibit a satisfactory record of previous installations.

- B. Dense Graded Aggregate (DGA):
 - 1. Graded aggregate and water mixed.
 - 2. Meet requirements of IDH Standard Specification, Section 303.
- C. Course Aggregate:
 - 1. Sound, angular crushed stone.
 - 2. Class A, B, C or D.
 - 3. Meet requirements of IDH Standard Specification, Section 903.02.

- D. Fine Aggregate:
 - 1. Sound, angular crushed stone and sharp-edged sand.
 - 2. Meet requirement of IDH Standard Specification; Section 903.01.
- E. Primer:
 - 1. Medium Cure Liquid Asphalt or Asphalt Emulsion.
 - 2. Meet requirements of IDH Standard Specification, Section 903.03.
- F. Tack:
 - 1. Rapid Cure Liquid Asphalt or Asphalt Emulsion.
 - 2. Meet requirements of IDH Standard Specification, Section 902.04
- G. Asphalt Cement:
 - 1. Prepared by the refining of petroleum.
 - 2. Viscosity grade: AC-20
 - 3. Meet requirements of IDH Standard Specification, Section 902.01.
- H. Joint and Crack Filler:
 - 1. Flexible elastomeric material with ultra violet inhibitors and asphalt cement.
 - 2. Meet or exceed AASHTO-M173
- I. Bituminous Sealer:
 - 1. High solids colloidal dispersion of selected coal tar pitch in water
 - 2. Meet or exceed ASTM D-3320-74T
 - 2. Meet requirements of IDH Standard Specifications.
- J. Lane Marking Paint:
 - 1. Factory Mixed, quick drying and non-bleeding alkyd oil based paint.
 - 2. FS TT-P-115, Type III.
 - 3. Color: White, except bus stalls to be yellow.
 - 4. Striping to be ADA blue at handicap spaces.

2.02 TABLE OF COMPOSITION LIMITS

Sieve Size	Metric Size	Percent Passing by Weight	
		Binder	Surface
1 inch	25.0 mm	-	-
3/4 inch	19.0 mm	100	-
1/2 inch	12.5 mm	70 - 92	-
3/8 inch	9.50 mm	50 - 76	100
No. 4	4.75 mm	35 - 40	95 - 100
No. 8	2.36 mm	18 - 45	70 - 90
No. 16	1.18 mm	10 - 36	40 - 68
No. 30	600 µm	6 - 26	20 - 50
No. 50	300 µm	2 - 18	7 - 30
No. 100	150 µm	0 - 11	1 - 20
No. 200	75 μm	0 - 5	0 - 4
Percent of Bitumen		4.3 - 5.4	7.0 - 8.0
Course Aggregate Size (Indiana Highway Standard)		No. 9	-
Fine Aggregate (Indiana Highway Standard)		-	Sand

PART 3 - EXECUTION

3.01 <u>GENERAL</u>

- A. All materials shall be spread using approved spreading equipment except when repairing small areas as approved by the architect. Tailgating of aggregates directly onto subgrade will not be acceptable.
 - 1. Asphalt pavers shall be self-propelled with receiving hopper of sufficient capacity to provide a uniform spreading operation.
 - 2. Rollers shall be steel wheeled weighing 10 ton or three wheeled rollers with bearing of 300 pounds per linear inch width of rear wheels.
- B. Contractor shall have on hand at the site prior to paving operation all necessary portable and hand tools and one stand-by roller.

3.02 PREPARATION

- A. All areas of the project to receive pavement repair or resurfacing shall be power broomed and power vacuumed to remove all loose debris, aggregate and trash.
- B. Existing deteriorated areas where pavement sections are missing (potholes, etc) or pavement base exhibit signs of becoming unstable shall be identified in the field by the contractor using a paint marking system.
- C. Existing pavement cracks over 3/8" wide shall be identified in the field by the contractor using a paint marking system.
- D. Contractor and Architect will review all areas after marking to verify all deteriorations have been identified.

3.03 DETERIORATED PAVEMENT REMOVAL

- A. Remove deteriorated pavement from the identified areas. Saw cut pavement to provide a clean edge for patching.
- B. Removal shall be in a rectangular shape and extend a minimum of 12" beyond all sides of the present deterioration.
- C. Existing pavement shall be removed as required to reach a stable base.
- D. In areas of base deterioration, complete removal of pavement and granular base is required.

3.04 SUB-BASE STABILIZATION

A. After complete removal of all pavement and base, notify Architect for inspection.

- B. Install soil stabilization fabric over entire earth area where pavement and base is removed.
- C. Place new stone base materials and compact.
- D. If pavement surrounding the removal area is scheduled to receive a new surface course, install binder course of asphalt, minimum 4" thick, up to the same level as existing adjacent pavement.
- E. If pavement surrounding the removal area is NOT scheduled to receive a new surface course, install binder course of asphalt, minimum 4" thick, up to a level 1-1/2" below existing adjacent pavement.

3.05 CRACK FILLING

- A. All identified cracks over 3/8" wide in areas to receive new pavement surface shall be completely filled.
- B. Fill material shall be hot applied between 280-400 degrees F.
- C. All filled cracks shall be inspected by Architect prior to installation of asphalt surface course.

3.06 MANHOLE AND CATCH BASINS

A. Manholes:

- 1. All existing manhole covers shall be raised to be level with new pavement finish.
- 2. Cut around manhole and remove pavement to allow removal of manhole frame and lid.
- 3. Install precast concrete rings as necessary to raise elevation of cover.
- 4. Reinstall cover and frame and fill entire area around frame with concrete up to existing pavement level.

B. Catch Basins:

- 1. All existing catch basins shall be raised to prevent a severe dip as a result of new pavement overlay.
- 2. Cut around catch basin a minimum of 24" and remove catch basin grate and frame.
- 3. Install precast concrete rings as necessary to raise elevation of catch basin frame.
- 4. Reinstall frame and grate. Fill area around frame with concrete up to 1" below existing asphalt.
- 5. New asphalt pavement shall slope to catch basin.

3.07 REPAVEMENT EDGES

- A. All edges where new pavement surface will not end at a vertical curb, or existing pavement edge shall be blended with the existing pavement surface.
- B. Contractor is given the option of using a cut out key-way or milling existing surface edge.

C. Milling:

- 1. Existing pavement surface where new pavement will abut shall be milled to remove asphalt and provide a smooth transition to the new surface course.
- 2. Taper the new asphalt to existing while maintaining full design thickness.
- 3. Seal edge of new surface course to existing using hot applied crack sealer.
- D. Key-Way:
 - 1. Saw-cut edges of strip 24" wide the entire length of the abutting edge.
 - 2. Remove asphalt to depth of topping pavement design.
 - 3. Taper the new asphalt to existing while maintaining full design thickness.
 - 4. Seal edge of new surface course to existing using hot applied crack sealer.
- E. Joint or edge where new surface meets and existing pavement surface shall be sealed using same hot urethane rubber as for crack filling.

3.08 SPREADING AND ROLLING

- A. Base Course, Compacted Stone Aggregates and DGA:
 - 1. Spread and compact in separate lifts, maximum 4" each, see details for depths.
 - 2. Extend lower lift 4" beyond next lift.
- B. Binder Course:
 - 1. Spread and roll to minimum finish depths indicate on details.
 - 2. Spread mixture at minimum temperature of 225°F.

- C. Surface Course:
 - 1. Spread and roll to minimum finish depths indicated on details.
 - 2. Finish installation shall be true to line and grade and within 1/2" of true elevation.
- D. Primer:
 - 1. Compacted Aggregate Base Course shall be primed prior to installation of binder course using 0.30 gallons per square yard of cut-back medium cure (MC-70) asphalt or asphalt emulsion (AEP)
- E. Tack:
 - 1. Base course, Binder Course and/or Existing Surface of asphalt shall be tacked prior to installation of subsequent courses using 0.15 gallons per square yard of cut-back rapid cure (RC-70) asphalt or asphalt emulsion (AE-T).

3.09 TRAFFIC-AND LANE MARKINGS

- A. Cleaning: Sweep and clean surface to eliminate loose materials and dust.
- B. Striping: Use alkyd-oil traffic lane-marking paint, factory-mixed, quick-drying, and non-bleeding.
- C. Apply paint with mechanical equipment to product uniform straight edges. Apply in 2 coats at manufacturer's recommended rates to form 4" minimum width lines.
- D. Use pre-cut stencils to paint directional arrows or lettering where noted on the drawings.

SUBMITTAL CHECK LIST

- 1. Asphalt Paving Mix Formula.
- 2. Sealcoating Technical Data
- 3. Joint and Crack Filler Technical Data

SECTION 02710 - WATER DISTRIBUTION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Domestic water system pipe and fittings.
- B. Connection of domestic water system to municipal water system.
- C. Fire protection water system pipe, fittings, valves and hydrants.
- D. Connection of fire protection water system to municipal water system.
- E. All costs associated with all permits, connection fees, survey documentation, as-built drawings, third-party tapping contractor if required by utility company, overtime if utility requires service interruption outside regular work hours, and like costs and scope of work.

1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02200 - Earthwork Section 02720 - Site Drainage Section 02730 - Sanitary Sewage

1.03 <u>REFERENCES</u>

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D 1785 Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80 and 120.
 - 2. ASTM D 2241 Specification for Polyvinyl Chloride (PVC) Pressure Rated Pipe (SDR Series).
 - 3. ASTM D 3034 Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.
 - 4. ASTM D 3139 Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
- B. American Water Works Association (AWWA):
 - 1. AWWA C 110 Gray Iron Fittings, 3 inches through 48 inches, for Water and Other Liquids.
 - 2. AWWA C 111 Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
 - 3. AWWA C 151 Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
 - 4. AWWA C 504 Rubber Seated Butterfly Valves.
 - 5. AWWA C 509 Resilient Seated Gate Valves 3 inch through 12 inch NPS, for Water and Sewage Systems.
 - 6. AWWA C 600 Installation of Ductile-Iron Water Mains and Appurtenances.
 - 7. AWWA C 900 Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 inch through 12 inch for Water.

1.04 <u>DEFINITIONS</u>

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.05 SUBMITTALS

A. Product Data for each type of pipe, pipe fitting, valve and accessory.

PART 2 - PRODUCTS

- 2.01 <u>PIPE</u>
 - A. Pipe sizes less than 3 inches that are installed below grade and outside building:

- 1. Polyvinyl Chloride (PVC) Water Pipe.
- 2. Conform to ASTM D 2241 with an SDR 21 rating.
- 3. Pipe joints shall be integrally molded bell ends in accordance with ASTM D 3139 with factory supplied elastomeric gaskets and lubricant.
- B. Pipe sizes 3 inches and larger that are installed below grade and outside building shall comply with one of the following:
 - 1. Ductile Iron Water Pipe:
 - a. In accordance with AWWA C 151.
 - b. Fittings shall be mechanical joint or push-on joint complying with AWWA C 110 or AWWA C 111 (Class 50).
 - 2. Polyvinyl Chloride (PVC) Water Pipe:
 - a. Meet requirements of AWWA C-900 and comply with ASTM D 2241, rated SDR 21 (Class 150).
 - b. Pipe joints shall be integrally molded bell ends in accordance with ASTM D 3034, with factory supplied elastomeric gaskets and lubricant.

2.02 GATE VALVES - 2 INCHES AND LARGER

- A. Manufacturers: Mueller Resilient Seat Gate Valves.
- B. AWWA C509, Iron Body, bronze mounted double disc, parallel seat type, non-rising stem with square nut, single wedge, resilient seat, flanged or mechanical joint ends, control rod, post indicator where noted on drawings, extension box and valve key.

2.03 BALL VALVES - 2 INCHES AND SMALLER

- A. Manufacturers: Mueller Oriseal.
- B. Brass Body, Teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA compression inlet end, compression outlet with electrical ground connector, with control rod, extension box and valve key.

2.04 BUTTERFLY VALVES - 2 INCHES TO 24 INCHES

- A. AWWA C 504, iron body, bronze disc, resilient replaceable seat, water or lug ends, infinite position lever handle.
- 2.05 CHECK VALVES, POST INDICATOR VALVES, AND BACKFLOW PREVENTORS
 - A. Specified in Section 13900 Fire Suppression.

2.06 HYDRANTS

- A. Type as required by utility company, local authority having jurisdiction and as indicated on the drawings. Shall be UL listed and comply with the American Water Works Association specification C 502-85.
- B. Hydrant Extensions: In multiples of 6 inches with rod and coupling to increase barrel length.
- C. Hose and Stream Connection: Match sized with utility company, two hose nozzles, one pumper nozzle. Provide connection type as required by local Fire Marshall.
- D. Valves and Connections: Provide valve opening size as required by local authority and gated connections to the main.
- E. Finish: Primer and two coats of enamel finish paint, color of body and tops per local authority.

2.07 <u>ACCESSORIES</u>

- A. Provide concrete thrust blocks using concrete to provide sufficient bearing area to transmit unbalanced thrust from bends, tees, caps, or plugs to undisturbed soil without loading undisturbed soil in excess of 2,500 PSF at 100 psi water main pressure.
- B. Tracer Wire:
 - 1. Basis of Specification: "Performance Wire and Cable, Inc.", Tracer Wire.
 - 2. Description:
 - a. Solid copper single conductor tracer wire insulated with a low density polyethylene (LDPE).
 - b. Designed to carry a radio signal to aid in the location of buried plastic piping.
 - 3. Size wire as required , 12 AWG conductor minimum.
- C. Identification:
 - 1. Tracer wire to be terminated at the service entry to the building and exposed for access.
 - a. Interior to building: terminate for water service entry at main shut off valve and for fire service entry at riser location.
 - b. Exterior to building (when interior is not feasible): terminate above ground at point of entry of piping into building.
 - 2. Tag and label wire at service point termination as follows:
 - a. Domestic Water Lines: "DOMESTIC WATER SERVICE".
 - b. Fire Protection Water Lines: "FIRE PROTECTION WATER SERVICE".

PART 3 - EXECUTION

3.01 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fine aggregates.
- B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.
- C. Cut pipe ends square, ream pipe and tube ends and remove burrs.
- D. Remove scale and dirt, on inside and outside, before assembly.
- E. Prepare pipe for connections to equipment with flanges or unions.

3.02 BEDDING

- A. Excavate pipe trench and place bedding material. Provide trench wall shoring as required.
- B. Form and place concrete for pipe thrust restraints at any change of pipe direction and at fittings as indicated on Drawings.
- C. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth, each layer. Place compacted bedding material to elevation of paving subgrade.

3.03 INSTALLATION - PIPE AND FITTINGS

- A. Maintain separation of water main from sanitary and storm sewer piping in accordance with state or local codes or requirements of the Health Department.
- B. Install pipe and fittings in accordance with AWWA C600.
- C. Install pipe to allow for expansion and contraction without stressing pipe or joints or as specified by pipe

manufacturer.

- D. Install access fittings in accordance with local codes to permit disinfection of water system performed under this Section.
- E. Connections with Existing Pipelines: Where connections are made between new work and existing piping, make connection using suitable fittings for conditions encountered. Make each connection with existing pipe at time and under conditions which least interfere with operation of existing pipeline and in compliance with the local utility company.
- F. Form and place concrete for thrust blocks or other specified methods of retainage at each change of direction or end of pipe main.
- G. Establish elevations of buried piping in accordance with Section 02200 for work in this Section. Provide 36" minimum cover.
- H. Backfill trench in accordance with Section 02200.
- I. Install trace wire continuous buried 10 inches below finish grade, above pipe line. Trace wire shall be in accordance with local utilities standards.

3.04 INSTALLATION - VALVES AND HYDRANTS

- A. Install gate valves as indicated on Drawings and supported on concrete pads with valve stem vertical and plumb. Install valve boxes in a manner that will not transmit loads, stress, or shock to valve body. Center valve box over operating nut of valve vertical and plumb. Securely fit valve box together leaving cover flush with finished surface.
- B. Install fire hydrant assemblies as indicated on Drawings in vertical and plum position with stream/pumper nozzle pointed perpendicular to traffic where hydrant is adjacent to a street, roadway or parking lot drive or toward the protected building unless otherwise directed by local authorities. Support hydrant assembly on concrete pad and firmly braced on side opposite inlet pipe against undisturbed soil and concrete blocking. Place minimum of 6 cu. ft. of crushed stone or gravel around hydrant base and barrel after thrust blocking has cured at least 24 hours. Exercise care when backfilling and compacting so proper vertical position will not be altered.
- C. Provide a drainage pit 36 inches square by 24 inches deep filled with 2 inch washed gravel. Encase elbow of hydrant in gravel to 6 inches above drain opening. Do not connect drain opening to sewer.
- D. Paint hydrants in accordance with local utility company requirements.

3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Disinfect distribution system with chlorine before acceptance for domestic operation. Amount of chlorine shall be such as to provide dosage of not less than 50 parts/million. Thoroughly flush lines before introduction of chlorinating materials and after contact period of not less than 24 hours, system shall be flushed with clean water until residual chlorine content is not greater than 1.0 part/million. Open and close valves in lines being disinfected several times during contact period. After disinfection, take water sample and bacteriological test in accordance with AWWA specifications. Do not place distribution system in service until approval is obtained from applicable governing authorities.

3.06 SERVICE CONNECTIONS

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A. Provide water service connection in compliance with utility company requirements including reduced pressure backflow preventer if required and water meter with by-pass valves and sand strainer and as detailed on drawings.

3.07 FIELD QUALITY CONTROL

- A. Site Tests:
 - 1. Compaction:
 - a. Perform inspections prior to and immediately after placing bedding.
 - b. Perform tests as specified in Section 02200.
 - 2. Piping: Water distribution system pipe installed below grade and outside building shall be tested in accordance with following procedures:
 - Perform the testing of pipe materials, joints, and/or other materials incorporated into the construction of water mains and force mains to determine leakage and watertightness. All pressure pipeline shall be tested in accordance with Section 4 of AWWA C600 latest edition. In the event any state or local code requires a more stringent test, the more stringent shall apply.
 - b. Pressure Test: After the pipe has been laid, all newly laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 1.5 times the working pressure at the point of testing and not less than 1.25 times the working pressure at the highest point along the test section.
 - c. Leakage Test: The leakage test shall be conducted concurrently with the pressure test. Leakage is defined as the quantity of water that must be supplied into the newly laid pipeline, or any valved section thereof, to maintain pressure within 5 psi of the specified test pressure after the air in the pipeline has been expelled and the pipeline has been filled with water. Leakage shall not be measured by a drop in pressure in a test section over a period of time. No pipeline installation will be accepted if the leakage is greater than that determined by the following formula:

L = allowable leakage, (gallons per hour)

S = length of pipe tested, (feet)

L

D = nominal diameter of pipe, (inches)

P = average test pressure during test, (psig)

- d. Visible Leakage: All visible leaks shall be repaired regardless of the amount of leakage.
- e. Acceptance of Installation: If any test of pipe laid in place discloses leakage greater than that specified, the Contractor shall, at his own expense, locate the leak and make repairs as necessary until the leakage is within the specified allowance. Contractor shall supply all water for testing at no additional cost to the Owner.
- f. Provide one copy of results of meter test and hydrostatic pressure test to Architect and utility company upon completion of water distribution backfilling operations.

SUBMITTAL CHECK LIST

- 1. Product data for pipe, fittings, valves, and accessories.
- 2. Meter test.
- 3. Hydrostatic pressure test.

SECTION 02720 - SITE DRAINAGE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Section Includes:
 - 1. Polyethylene Plastic Piping (HDPE).
 - 2. PVC Piping.
 - 3. Cast Iron Grates and Covers.
 - 4. Catch Basins.
- B. All costs associated with all permits, connection fees, survey documentation, as-built drawings, third-party tapping contractor if required by utility company, overtime if utility requires service interruption outside regular work hours, and like costs and scope of work.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 02200 – Earthwork. Division 15 – Plumbing Systems.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's product data sheets, cutsheets, specifications and materials description.
 - 2. Manufacturer's installation and maintenance instructions.

1.04 JOB CONDITIONS

- A. Do not discharge water into sanitary sewers.
- B. Do not discharge water containing settleable solids into storm sewers.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Polyethylene Plastic Piping:
 - 1. "Advanced Drainage Systems (ADS)"
 - 2. "Prinsco".
 - 3. "Hancor".
 - 4. "Vericore Technologies".
 - 5. "Haviland Drainage Products".
 - 6. "Freedom Plastics, Inc.".
- B. Grates and Covers:
 - 1. "Neenah".
 - 2. "Advanced Drainage Systems (ADS)".
 - 3. "Prinsco".
 - 4. "Freedom Plastics, Inc.".
 - 5. "Drainage Solutions, Inc."

2.02 MATERIAL

- A. Polyethylene Plastic Piping (HDPE):
 - 1. Provide one of the following approved products:
 - a. "ADS" N-12.

- b. "Prinsco" Goldflo and Goldflo WT.
- c. "Haviland" Smooth Flow Pipe.
- 2. Heavy duty, HDPE polyethylene plastic, solid.
- 3. Dual wall, corrugated exterior with smooth interior wall.
- 4. AASHTO rated for typical highway loads.
- 5. Soil-tight joints per AASHTO section 26.
- 6. Fiittings, couplings, and joints as required.
- 7. To comply with all requirements of AASHTO M-252 (3"-10") and AASHTO M-294 (12" and larger). Includes test methods, dimensions, markings, etc.
- 8. Minimum pipe stiffness to comply with ASTM D-2412.
- 9. Pipe and fittings shall be made of polyethylene compounds which meet or exceed the requirements of Type III, Category 4 or 5, Grade P33 or P34, Class C per ASTM D-1248.
- 10. Male and female pipe ends which allow the construction of overlapping, gasketed joints, shall be in accordance with ASTM D-3212.
- 11. Gaskets shall be flexible, elastomeric neoprene to meet or exceed the requirements of ASTM F-477.
- 12. Provide perforated pipe in locations as shown per plans.
- B. PVC Piping:
 - 1. Schedule 40 typical at all lawn and landscape areas.
 - 2. Schedule 80 below all drives, roads, alleys, parking areas and like conditions.
 - 3. Schedule 120 at other conditions where indicated on the Drawings.
- I. Grates and Covers for Plastic Piping:
 - 1. Provide one of the following approved products:
 - a. "ADS" Ductile Grates, drop-in type.
 - b. "Freedom Plastics, Inc." Ductile Grates, drop-in type.
 - c. "Neenah", Ductile Grates, drop-in type.
 - 2. Light duty (5,000 lbs. rated) in all lawn or landscape areas or concrete walk areas.
 - 3. Heavy duty (H-20, DOT rated) in all paved areas, parking lots, drives or other vehicular access area.
 - 4. Grates designed to accommodate the heavy-duty PVC drainage structure piping.
 - 5. All inlet grates to be slotted type, domed in all lawn or landscape areas, flat in all paved areas.
 - 6. High flow vane type at all curb inlets, 24" x 36", unless otherwise noted.
 - 7. Install slots and openings in grates perpendicular to flow of traffic.
 - 8. Manhole and cleanout covers to be solid type version of inlet grates, flat and soil tight.
 - 9. All ductile grates to conform to all requirements of ASTM A-536 grade 70-50-05.
- J. Cast Iron Grates and Covers:
 - 1. Sizes and configurations as indicated on the Drawings.
 - 2. Heavy duty (H-20, DOT rated) in all areas.
 - 3. All inlet grates to be slotted type, domed in all lawn or landscape areas, flat in all paved areas.
 - 4. Install slots and openings in grates perpendicular to flow of traffic.
 - 5. Manhole and cleanout covers to be solid type version of inlet grates, flat and soil tight.
- K. Catch Basin:
 - 1. Precast Concrete, Sitecast Concrete, HDPE Polyethylene, or PVC as indicated on Drawings.
 - 2. Size and configurations as required for each condition.

PART 3 - EXECUTION

3.01 <u>STORM PIPING</u>

A. Installation shall be in accordance with manufacturer's published recommendations, local City or agency requirements and per ASTM Recommended Practice for the applicable piping material.

- B. Lay pipe to provide uniform bearing with 1/8" per foot drainage slopes, or as indicated on the Drawings.
- C. Provide and install all couplings, fittings and accessories as required for a complete installation.
- D. Seal all joints water tight and soil tight.
- E. Provide cleanouts and manholes as indicated on the Drawings.
- F. Backfill pipe excavation, particularly bedding, with materials and compaction per manufacturer's specifications for each condition present, to provide a water tight and soil tight system.
- G. Installation depth shall provide for a minimum cover of 1'-0" for all pipe 48" in diameter and less, and 2'-0" for pipe over 60" in diameter.

SUBMITTAL CHECKLIST

1. Product Data.

SECTION 02730 - SANITARY SEWAGE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision, and services required to complete the following work indicated, noted, detailed on the drawings and specified herein.
- B. All costs associated with all permits, connection fees, survey documentation, as-built drawings, thirdparty tapping contractor if required by utility company, overtime if utility requires service interruption outside regular work hours, and like costs and scope of work.

1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02200 - Earthwork Section 02710 - Water Distribution Section 02720 - Site Drainage

1.03 <u>REFERENCES</u>

- A. ASTM C76 Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
- B. ASTM D1785 PVC Plastic Pipe, schedule 40, 80 and 120.
- C. ASTM 02665 PVC Plastic Drain, Waste and Vent Pipe and Fittings.

1.04 <u>SUBMITTALS</u>

- A. Submit manufacturer's product literature.
 - 1. Published product data sheets.
 - 2. Include date on pipe materials, pipe fittings, valves and accessories.

PART 2 - PRODUCTS

- 2.01 SANITARY SEWER PIPING
 - A. PVC Schedule 40 or 80.
 - B. Fittings: PVC Schedule 40 or 80, designed for solvent welded constructions.

2.02 <u>MANHOLES</u>

- A. Precast concrete 48 inch diameter.
- B. Provide pipe connections cast into unit.
- C. Provide cast iron manhole frame and lid, 24 inch minimum diameter.
- D. Manhole steps cast into units.

PART 3 - EXECUTION

3.01 <u>EXCAVATION AND BACKFILL</u> A. Refer to Section 02200 for materials and quality control.

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B. Bottom of trench shall be shaped to give substantially uniform support to the lower third of all pipe. The full length of each section of pipe shall rest solidly upon pipe bed.

3.02 INSTALLATION

- A. Route piping in orderly manner and maintain gradient.
- B. Route piping to minimize excavation. Group piping whenever practical.
- C. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.
- D. Cleanouts shall be at grade and supported by a poured concrete box 24 inch x 24 inch x 12 inch thick.
- E. Establish invert elevations, slopes for drainage 1/8 inch per foot.
- F. Provide a minimum of 24" of cover.

3.03 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work check tap locations, invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage.

SUBMITTAL CHECK LIST

1. Product Literature.

SECTION 02750 - CONCRETE PAVING AND CURBS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, material, equipment, special tools, supervision and services required to deliver and place all cast-in-place site concrete indicated, noted and detailed on the drawings and specified herein.
- B. Types of work in this section includes, but not limited to the following:
 - 1. Concrete drives and aprons.
 - 2. Concrete walks.
 - 3. Concrete curbs, slip form machine or rigid form types.
 - 4. Reinforcing steel, anchor bolts, forms and form removal.

1.02 QUALITY ASSURANCE

- A. Comply with the following standards:
 - 1. ACI Standards (latest editions) for construction procedures. Including but not limited to:
 - a. Specifications for Structural Concrete for Buildings (ACI-301).
 - b. Recommended Practice for Hot Weather Concreting (ACI-305).
 - c. Recommended Practice for Winter Concreting (ACI-306).
 - d. Building Code Requirements for Reinforced Concrete (ACI-318-89).
 - e. Recommended practice for Field Evaluation of Compressive Test Results of Field Concrete (ACI-214).
 - 2. ASTM Standards (latest editions) for material specifications.
- B. Testing:
 - 1. Pay costs of independent testing agency approved by Architect/Engineer, tests and necessary re-testing and re-inspection.
 - 2. Perform following tests, by certified concrete field technician.
 - a. Slump tests: ASTM C 143.
 - b. Compression tests: ASTM C 31 and C 39.
 - c. Air entrainment: ASTM C 138 or C 231.
 - 3. Concrete Field Tests:
 - a. Five (5) 6 inch by 12 inch concrete cylinders shall be molded for each 50 cubic yards or each day's pour if less than 50 yards.
 - b. Cylinders shall remain undisturbed in a secure location on the site for 24 hours after which they shall be removed to the testing lab by laboratory personnel.
 - c. Two of the cylinders shall be tested at 7 days and two at 28 days.
 - d. Failure to the concrete to meet the specification requirements may result in its complete removal and replacement at the Contractor's expense.
 - e. Cost of re-test, if any, will be at the Contractor's expense.
- C. Allowable tolerances:
 - 1. Formed surfaces: Table 4.3.1, ACI 301.
 - 2. Slabs finished level: $\pm 1/4$ " of floor elevation.
 - 3. Class A finishes: True planes $\pm 1/8"$ in ten feet for troweled slabs.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Store materials to prevent contamination, deterioration, and weather damage.
- B. Deliver ready-mixed concrete to point destination in conformance to ASTM C94.

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1.04 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather:
 - 1. Comply with ACI 306 when temperature is 40°F or lower.
 - 2. Maximum concrete temperature 90°F, minimum 50°F per ASTM C94.
- B. Hot Weather:
 - 1. Comply with ACI 305.
 - 2. Maximum concrete temperature 90°F.
 - 3. Protect from rapid evaporation by spraying or sheeting.

1.05 SUBMITTALS

- A. Reinforcing Steel Shop Drawings:
 - 1. Indicate all reinforcing steel sizes, locations, support locations/details, lengths laps and bend details.
 - 2. Indicate all reinforcing strengths and quantities.
- B. Concrete Mix Design:
 - 1. A separate mix design for each class and type of concrete is required.
 - a. Include literature for admixtures.
 - b. Include applicable compliance with referenced ASTM number.

PART 2 - PRODUCTS

- 2.01 <u>MATERIALS</u>
 - A. Portland Cement:
 - 1. ASTM C150-71, Type I or II.
 - B. Air Entraining Cement:1. ASTM C150, Type IA or IIIA.
 - C. Aggregates:
 - 1. ASTM C33.
 - 2. Coarse Aggregates:
 - a. Clean, tough, durable fragments of uncrushed gravel or crushed stone free from dirt or objectionable matter.
 - b. Size: Maximum 1-1/2" at footings; 1" in slabs.
 - 3. Fine aggregate: Natural sand; clean, sound, hard, durable particles; gradation size No. 1.
 - D. Water:
 - 1. Clean, free from injurious amounts of oil, acids, alkalies, organic matter or deleterious substances, potable.
 - E. Admixtures:
 - 1. Air Entraining Agent: Neutralized vinsol resin solution, conforming to ASTM C260.
 - 2. Water Reducing Agent: ASTM C 494, Types as required to provide controlled setting and/or controlled rate of hardening without increase in water/cement ratio or loss in strength.
 - 3. Pozzolan: ASTM C618.
 - 4. Accelerators and retarders: ASTM C 494; permitted only upon approval of Architect/Engineer.
 - 5. Do not use calcium chloride without permission of Architect.
 - F. Curing Material:

- 1. Liquid Membrane: ASTM C 309.
- 2. Acrylic copolymer solution, transparent, quick drying, non-yellowing.
- 3. Compatible with flooring adhesives.
- 4. "Kure-N-Seal" by Sonneborn or equivalent.
- G. Reinforcement:
 - 1. Bars: ASTM A 615 Grade 60.
 - 2. Welded Wire Fabric: ASTM A 185, 6 x 6 W1.4 x W1.4, or as indicated.
 - 3. Reinforcing fibers will be allowed for use in exterior walks in lieu of welded wire fabric.
- H. Expansion Joint filler:
 - 1. Closed cell polyethylene or polyurethane foam.
 - 2. "Sonocrete" by Sonneborn or equivalent.
- I. Metal Accessories:
 - 1. Spacers, chairs, ties and other devices necessary for properly assembling, placing, spacing and supporting reinforcing.
 - 2. Minimum 3/4" cover for all metal accessories.
- J. Non-Shrink Grout:
 - 1. Pre-mixed, factory packaged, non-staining, non-metallic, non-gassing mortar compound.
 - 2. ASTM C 827, C 191 and C 109.
- K. Vertical Joint Sealants:
 - Multi-Component Polyurethane Sealant: Provide manufacturer's standard, non-modified, 2-or-more-part, polyurethane-base, elastomeric sealant; complying with ASTM C920 Type M Class 25, nonsag grade/type.
 - 2. "Sonneborn", "SONOLASTIC NP II"
- L. Horizontal Joint Sealants:
 - Self-leveling grade/type, provide sealant with cured modulus of elasticity at 100% elongation of not more than 150 psi (ASTM D 412 test procedure), and Shore A hardness of not less than 55 (ASTM D 2240). Where nonsag grade/type is required, provide sealant with cured modulus of elasticity at 100% elongation of not more than 75 psi and Shore A hardness of 20 to 30.
 - 2. "Sonneborn", "SONOLASTIC PAVING JOINT SEALANT"

2.02 MIX DESIGNS

- A. Design mix with appropriate adjustments for air content and aggregate proportions.
- B. Air Entrainment for concrete exposed to weather: air content controlled between 4 and 6% by volume.
- C. Compressive strength at 28 days: 3500 psi.
- D. Slump: 3 in. +/- 1 in.

2.03 <u>MIXING</u>

- A. Measure and mix materials for ready mixed concrete in conformance with ASTM C94.
- B. Take into account free moisture in the aggregate weight.

2.04 FORMWORK

- A. Provide formwork to conform to shape, lines and dimensions of members indicated on Drawings.
- B. Construct formwork sufficiently tight to prevent leakage.
- C. Construct formwork for exposed smooth surfaces of plywood or other similar smooth material.
- D. Bevel exposed concrete corners 3/4" unless otherwise indicated on drawings.
- E. Form coatings:
 - 1. Non-staining.
 - 2. Apply before reinforcing steel is placed.
- F. Tolerances: ACI 347.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

- A. Ensure slab subgrade is well drained, of adequate, uniform load bearing nature, and not muddy, soft or frozen.
- B. Extend the compacted stone base of the adjacent pavement section beneath the curb and/or gutter for the full width of their construction and profile, whether indicated or not on the Drawings.
- C. Dampen subgrade ahead of concreting.
- D. Test Below-slab pipes prior to casting concrete.
- E. Verify reinforcement and anchors, expansion joint material and embedded items are secured in position.
- F. All construction joints shall be keyed vertical bulkheads. No horizontal joints shall be allowed. All reinforcing shall continue through joint.
- G. The Architect or his representative shall be given 24 hours notice to inspect placement of reinforcing steel before concrete is placed.

3.02 PLACING

- A. Convey concrete from mixer to form as rapidly as practicable, by methods which will prevent segregation or loss of materials.
- B. Vertical drops: maximum three feet free fall.
- C. Place concrete as nearly as possible to its final position at a rate so it remains plastic and flows readily into position. Proceed with placing as a continuous operation until unit of construction is complete. Use vertical construction joints to avoid horizontal joints between concrete placement.
- D. Do not use retempered concrete or concrete partially hardened or contaminated with foreign material.
- E. Ensure forms and conveyance equipment is clean and free of ice, water, debris and hardened concrete.
- 3.03 FINISHING: CONCRETE FINISH SCHEDULE

- A. Stoops: Broom finish.
- B. Walks: Broom finish. (Hard trowel smooth at expansion and control joints).
- C. Steps: Vertical surfaces rubbed; horizontal surfaces broom finish.
- D. Retaining Walls: Rubbed.

3.04 <u>CURING</u>

- A. Formwork shall remain in place five (5) days before being removed. Remove all formwork in such a manner and at such time as to not damage concrete surfaces and to ensure complete safety to the structure.
- B. Slabs and other horizontal surfaces shall be moist cured for seven days or have a curing compound applied immediately following completion of finishing after water sheen has disappeared.
- C. Moist curing shall be performed by application of polyethylene sheeting per ASTM C171 or continuous wetting of burlap or other type of absorptive mat.
- D. Curing Compounds:
 - 1. Spray or brush uniformly in a single coat immediately after final finishing operation, at rate recommended by manufacturer.
 - 2. Do not use material which discolors concrete
- E. Meet requirements of hot and cold weather concreting.

3.05 PROTECTION

- A. Protect fresh concrete from heavy rains, extreme air temperatures, injurious sun, mechanical injury and other deleterious elements.
- B. If scaling occurs from failure to take protective precautions, repair or replace damaged concrete.

3.06 PATCHING

A. Do not patch any surface until examination is made by the Architect and permission is given.

3.07 BUILT-IN WORK

A. Coordinate all openings and chases required in the concrete work and provide all items to be cast into the concrete pour.

3.08 JOINTS

- A. Locate and construct all joints as shown on the Drawings, or if not shown, as specified herein, or if not specified, as directed by Architect.
- B. Construction Joints.
 - 1. May be substituted for control or contraction joints in slabs on grade at the indicated locations of such joints or as approved by the Architect.
 - 2. Provide keyed joints between all cast sections of slabs on grade.
- C. Control Joints:
 - 1. Depth: Minimum 1" deep using early entry dry cut saws.
 - 2. Width: Maximum 3/16".
 - 3. 10 feet on center maximum, each way, or as shown on drawings.

- 4. Walks: as indicated on drawings, or if not indicated, at 4 feet on center or the width of the walk whichever is less.
- 5. Walls: Size and location as shown on Drawings or 25 feet o.c. each way, whichever is less.
- 6. Saw cut joints are <u>not</u> acceptable unless authorized in writing by Architect.
- 7. Wet cut joints within 24 hours of placing.
- D. Expansion Joints:
 - 1. Install 1/2" expansion joint filler at concrete pavement joints; hold down below surface or cut the required depth for sealant.
- E. Carry reinforcement across joints in slabs except at expansion joints.

SUBMITTAL CHECK LIST

- 1. Concrete Mix Design.
- 2. Reinforcement Steel Shop Drawings.

SECTION 02751 - CAST IN PLACE DETECTABLE/TACTILE WARNING SURFACES

PART 1 – GENERAL

1.01 GENERAL DOCUMENTS

A. Drawings and general provisions of Contract, including General and Special Conditions and Division 1 Specifications Section, apply to this Section.

1.02 DESCRIPTION

A. This Section specifies furnishing and installing Detectable/Tactile Warning Surface Tiles in concrete where indicated.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's published literature describing products.
 - 2. Submit manufacturer's installation procedures.

B Shop Drawings:

- 1. Showing fabrication details, composite structural system, tile surface profiling.
- 2. Plans of tile placement including joints.
- 3. Installation materials and procedure.

C. Samples:

- 1. Provide color samples. Actual samples may be requested in lieu of color charts.
- 2. Color to be selected by Architect from manufacturer's entire selection available.

1.04 QUALITY ASSURANCE

A. Americans with Disabilities Act (ADA): Provide Detectable/Tactile Warning Surface Tiles which comply with the detectable warnings on walking surfaces section of the Americans with Disabilities Act.

1.05 DELIVERY, STORAGE AND HANDLING

A. Cast In Place Detectable/Tactile Warning Surface Tiles shall be suitably packaged or crated to prevent damage in shipment or handling. Finished surfaces shall be protected by sturdy plastic wrappings to protect tile from concrete residue during installation and tile type shall be identified by part number.

1.06 <u>GUARANTEE</u>

A. Cast In Place Detectable/Tactile Warning Surface Tiles shall be guaranteed in writing for a period of five (5) years from date of final completion. The guarantee includes defective work, breakage, deformation, facing and loosening of tiles.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide products, as approved by the Architect, from one of the following manufacturers:

- 1. Armor-Tile.
- 2. Detectable Warning Systems.
- 3. U.S.A. Safety Domes.
- 4. Vanguard ADA Systems.
- 5. ADA Solutions, Inc.
- 6. Step Safe.
- 7. Advantage Tactile Systems, Inc.
- 8. USA Safety Domes.

- 9. Strong Go Industries.
- 10. Alert Tile.
- 11. Armorcast Products Company.
- 12. Hanover Architectural Products.
- 13. East Jordan Iron Works.

2.02 WARNING SURFACE SYSTEM

- A. Premanufactured units in 24" x 36" or 24" x 48" nominal sizes. Other sizes may be used for irregular shaped conditions.
- B. Depth: 1/2" minimum.
- C. Water Absorption: Not to exceed 0.05%, ASTM D570.
- D. Slip Resistance: Not less than 0.80, ASTM C1028.
- E. Color: To be selected by Architect from manufacturer's entire selection.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Concrete shall be poured and finished to proper level, profile and slope.
- B. Install warning surface in wet concrete with anchor lugs per manufacturer instructions.

SUBMITTAL CHECK LIST

- 1. Product Data.
- 2. Shop Drawings.
- 3. Color Samples.

SECTION 02826 - ALUMINUM LOUVERED GATES

PART 1 - GENERAL

1.01 WORK INCLUDED

Furnish labor, materials, equipment, special tools, supervision and services required to furnish and install complete aluminum louvered gates indicated, on the drawings and specified herein.

1.02 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's product data sheets, cutsheets, specifications, materials description, installation and maintenance instructions.

B. Shop Drawings:

- 1. Include fabrication details, dimensions, widths, heights, connections and accessories.
- C. Samples:
 - 1. Where colors are specified, submit one actual sample of each color specified.
 - 2. Where colors are not specified or are specified as "to be selected", submit samples showing manufacturer's full range of standard colors.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. "Ametco Manufacturing Corporation" 4326 Hamann Parkway Willoughby, Ohio 44096

2.02 MATERIALS

- A. Extruded aluminum: ASTM B221, Alloy 6063, Temper T-6.
- B. Sheet aluminum: ASTM B209 6063, Temper T-6.
- C. System:
 - 1. "Venetian", V-shaped louver blade providing 100% visual blocking.
 - 2. Louver Bars: 1-3/4" x 2-1/2", spaced at 2-5/8".
- D. Finish:
 - 1. Powder Coat.
 - 2. 10-year warranty.
 - 3. Color to be selected from manufacturer's entire standard selection.

2.03 <u>GATES</u>

- A. Height:
 - 1. As indicated on Drawings.
 - 2. If not indicated, provide at 8 feet high.
- B. Type:
 - 1. Hinged Swinging.

C. Gate Frames:

- 1. Welded, fabricated from extruded aluminum tubing.
- 2. Diagonal brace: If required, concealed on inside of gate.
- D. Louver Bars:
 - 1. Installed vertically, unless otherwise indicated on Drawings.
- E. Sizes:
 - 1. Single or pair of gates to sizes as indicated on Drawings.
 - 2. Provide pairs of gates in two equal sections, unless indicated ortherwise.
- F. Hardware:
 - 1. Hinges: 3 hinges per leaf, stainless steel.
 - 2. Latch: 3/4" Ø slide bolt to accommodate padlock, stainless steel.
 - 3. Gates: 5/8" Ø center cane bolt, assembly and strike, stainless steel.
 - 4. Fasteners: Stainless steel bolts.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify all masonry openings where gates are to be installed.

3.02 INSTALLATION

A. Gates:

- 1. Install gates plumb, level and secure for full opening without interference.
- 2. Adjust hardware for smooth operation and lubricate where necessary.
- 3. Touch up damaged finish.

SUBMITTAL CHECK LIST

- 1. Product Data:
- 2. Shop Drawings.
- 3. Samples.

SECTION 02840 – PARKING STOPS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Furnishing and installing prefabricated plastic parking stops where indicated.

1.02 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's published literature describing products.
 - 2. Submit manufacturer's installation procedures.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Belson Outdoors.
- B. Checkers Industrial Safety Products.
- C. Markstaar.

2.02 PLASTIC PARKING STOPS

- A. Premanufactured units: 72" long x 6" wide x 3.25 " high.
- B. 100% recycled plastic, solid color.
- C. Mounting Hardware:
 - 1. Lagbolt at concrete pavement.
 - 2. Steel spike at asphalt pavement.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install with anchor system per manufacturer instructions.

SUBMITTAL CHECK LIST

- 1. Product Data.
- 2. Shop Drawings.

SECTION 02870 - SITE FURNISHINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Site furnishings as indicated on the Drawings and specified herein.1. Tree Grates.

1.02 <u>GUARANTEE</u>

A. Provide written guarantee against defective workmanship and materials for a period of two (2) years from the date of final acceptance by the Owner.

1.03 <u>SUBMITTALS</u>

A. Product Data:

- 1. Submit manufacturer's published literature describing products.
- 2. Submit manufacturer's installation procedures.
- 3. Submit manufacturer's color charts for finish selections of all materials.
- B. Shop Drawings:
 - 1. Showing details of installation and anchoring.
 - 2. Installation materials and procedure.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following manufacturers:
 - 1. "Ironsmith Inc." (Ironsmith).
 - 2. "Wabash Valley Manufacturing, Inc." (Wabash Valley).

2.02 TREE GRATES

- A. Provide one of the following approved products:
 - 1. "Wabash Valley", Tree Grates, #TG172.
 - 2. "Ironsmith", Tree Grates, 7205-2.

B. Description:

- 1. Type: 72" square with 16" tree well opening.
- 2. Mounting: Within 2" perimeter grate frame.
- 3. Metal Pattern: Olympian.
- 4. Finish: Pre-finished powder coated, all surfaces.

To be selected by Architect from manufacturer's entire standard selection. Multiple color selections may be made between units.

PART 3 - EXECUTION

3.01 INSTALLATION OF TREE GRATES

- A. Install in strict accordance with manufacturer's published instructions and recommendations.
- B. Set perimeter grate frame in concrete per manufacturer's details to coordinate with tree grate size.

THE VILLAGE @ WEST JEFFERSON Louisville, Kentucky

- C. Set grate frame level and plumb and to correct position and orientation.
- D. Coordinate location of tree well opening with tree to be centered within the diameter of the space.
- E. Install tree grate onto grate frame for a flush and level setting.
- F. Correct any deficiencies in the grate frame or the tree grate's position atop the surface.

SUBMITTAL CHECK LIST

- 1. Product Data.
- 2. Shop Drawings.

SECTION 02930 - LAWNS AND GRASSES

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete establishment of lawns.
 - B. Sod to be provided at areas indicated on the drawings.
 If not indicated, sod all banks, swales and other areas were a seeded lawn establishment is impractical.
 - C. Seed all lawn areas indicated on the drawings. All areas throughout the project that are newly provided or disturbed by any grading activities are to be seeded, whether indicated or not. See description above for areas to be sodded in lieu of seeding.
 - D. Seed any areas of construction project limits where disturbed by construction activities, whether indicated or not.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02110 - Site Clearing. Section 02200 - Earthwork. Section 02950 - Trees, Plants and Ground Covers. Section 02953 - Aluminum Maintenance Edging

1.03 QUALITY CONTROL

- A. Requirements of Regulatory Agencies:
 - 1. Indiana State Seed Law.
 - 2. Indiana Highway Commission Standard Specifications 621.02.

B. Standards:

- 1. Indiana Association of Nurserymen.
- 2. American Association of Nursery Horticultural Standards.
- C. Source Quality Control:
 - 1. Producer's tests for purity and germination of seed, dated within nine months of sowing.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Deliver seed and fertilizer in supplier's original unopened package.
 - 2. Deliver sod on pallets.
- B. Store seed and fertilizer in cool, dry area protected from exposure to elements, ground moisture or spoilage.

C. Handling:

- 1. Handle seed and fertilizer materials to prevent contamination or spillage.
- 2. Protect sod from dehydration, contamination and heating.
- 3. Keep stored sod moist and shaded or covered with moistened burlap.
- 4. Do not pile sod over 2 ft. deep.
- 5. Do not tear, stretch or drop sod.

1.05 SITE CONDITIONS

- A. Perform seeding only when preceding related work has been completed.
- B. Do not perform seeding after a rain or when wind velocity exceeds 15 mph.
- C. Restrict foot and vehicular traffic from lawn areas after planting to end of establishment period.

1.06 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Submit manufacturer's published literature describing products.
 - 2. Submit design mixture of seed and sod.

PART 2 - PRODUCTS

2.01 <u>SEED</u>

- A. Percentages by weight, approximate:
 - 1. 80% Fine Blade Fescue (chewings fescue, creeping red fescue and hard fescue).
 - 2. 10% Kentucky Bluegrass.
 - 3. 10% Perennial Rye.
- B. Germination:
 - 1. 80% minimum.

2.02 <u>SOD</u>

- A. Fine Blade Fescue:
 - 1. Grass composition to match seed mix specified.
 - 2. Fibrous, well and deeply rooted.
 - 3. Grown in general locality of use.
 - 4. Free from all noxious and pernicious weeds.

B. Size:

- 1. Width: 18" minimum.
- 2. Length: 36" or as convenient for handling.
- 3. Thickness: 1" minimum.
- C. Grass Height:
 - 1. Uniform thickness with cut height of 3".
 - 2. Soil thickness to be not less than 1" and not more than 1-1/2".
- D. Uniformity in color, texture, density and width with even edges.

2.03 SEED-STARTER STRAW MAT / BLANKET

- A. Description:
 - 1. Basis of Specification: "Guardian", Seed-Starter Mat.
 - 2. 100% weed-free wheat straw.
 - 3. To keep seed in place, shield seeds from pecking birds and hold moisture for seed germination.
 - 4. To not clump, wash or blow away.
 - 5. Mat/Blanket and all fasteners shall completely biodegrade and disappear once lawn is established, without physical removal.
- B. Materials:
 - 1. 3.33 feet wide x 54 feet long roll of seed protection mulch mat/blanket.
 - 2. Biodegradable "BioSTAKEs", 4 inches in length, 36 per roll.

2.04 <u>FERTILIZER</u>

- A. Commercial Mixture 8-16-16 or as recommended by State Agricultural Extension Service.
- B. Note that this fertilizer mix has a 1-2-2 or low nitrogen N-P-K ratio, which shall be maintained.

2.05 ACCESSORIES

- A. Mulch:
 - 1. Straw, weed free, as specified in Indiana Highway Specifications 913.05.
 - 2. Manufactured Products:
 - a. Conwed Fibers; "Hydro Mulch".
 - b. Sylva Corporation, Inc.; "Sylva-Fiber".

B. Stakes:

1. Softwood, 3/4" x 8", for sodded slopes as required.

C. Erosion Control Blanket:

- 1. Basis of Specification:
 - a. "American Excelsior Company", AEC Premier Straw Double Net.
 - b. "Forestry Suppliers, Inc.", Jute Mesh Erosion Control Mat.
- 2. Acceptable alternate products may be submitted by the Contractor for approval by the Architect.
- 3. Shall contain agricultural straw fibers, free of weeds, for the purpose of erosion control, revegetation and lawn establishment atop newly seeded areas.
- 4. Blanket and all fasteners shall completely biodegrade and disappear once lawn is established, without physical removal.
- 5. May use Seed-Starter Straw Mat / Blanket in lieu of the erosion control blanket.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

- A. Verify that preceding work affecting ground surface is completed.
- B. Seed:
 - 1. Immediately before seeding is to occur, the entire surface shall be scarified as required and raked until the surface is smooth, friable and a uniformly fine texture.
 - 2. Till soil thoroughly to minimum depth of 4".
 - 3. Apply fertilizer to soil at rate of 12 pounds per 1,000 square feet immediately prior to seeding.
 - 4. Rake or lightly till fertilizer into soil.

C. Sod:

- 1. Scarify soil to depth of 2" in compacted area.
- 2. Apply fertilizer to soil at rate of 12 pounds per 1,000 square feet immediately prior to seeding.
- 3. Lightly moisten sod immediately prior to laying sod during hot weather.
- D. Watering:
 - 1. When topsoil is exceedingly dry, moisten to depth of 4", 48 to 72 hours prior to start of seeding.
 - 2. Perform watering to prevent run off.

3.02 <u>SEEDING</u>

A. Shall only be done within the seasons as follows, unless allowed by the Architect and Owner:

- 1. March 1 to May 15.
- 2. September 1 to October 15.
- B. Before the seed is to be sown, all soft spots and inequalities in grade shall be corrected.
- C. Prior to seeding, mix commercial fertilizer into the seedbed at a rate of 12 pounds per 1,000 square feet.
- D. Seed shall be spread uniformly over entire area in 2 operations at rate of 5 pounds per 1,000 square feet each, for a total of 10 pounds per 1,000 square feet.
- E. Apply second seeding at right angles over the first.
- F. Seeding operation may be by mechanical spreader, broadcast method, drill equipment or hydroseed.
- G. Lightly cover seed by hand raking lawn areas to depth of 1/4".
- H. Smooth and firm all seeded areas with 200 pound roller and water with a fine spray.
- I. Install mulch over all seeded areas at a rate of 1,500 pounds per acre and crimp in place for anchorage. It may be applied via hydraulic mulching equipment or may be added to a water slurry in a hydraulic seeder and combined into a single operation. Straw applied at a rate of two bales per 1,000 square feet may serve as an alternative to the aforementioned mechanical mulching process at contractor's option.
- J. Contractor shall establish a smooth, uniform turf and surface composed of the specified grasses.
- K. Immediately following seeding and mulching, an approved erosion control blanket shall be placed over all areas having a slope of 5:1 or greater. The erosion control blanket shall be staked or stapled into place as per the manufacturer's recommendations. May use Seed-Starter Straw Mat / Blanket in lieu of the erosion control blanket.

3.03 SODDING

- A. Shall only be done within the seasons as follows, unless allowed by the Architect and Owner:
 - 1. March 1 to May 15.
 - 2. September 1 to October 15.
- B. Before the sod is to be laid, all soft spots and inequalities in grade shall be corrected.
- C. Prior to sodding, mix commercial fertilizer into the seedbed at a rate of 12 pounds per 1,000 square feet.
- D. Lay first row of sod in straight line with long dimension perpendicular to angle of slope.
- E. Start sodding at bottom of slopes.
- F. Butt rows tightly together so that no voids occur.
- G. Stagger end joints.
- H. Do not fill joints between pads.
- I. Tamp or roll entire sodded area just prior to watering.

- J. Provide initial watering of sod as it is being placed.
- K. Roll each area immediately after initial watering.
- L. Water entire sodded area thoroughly within 4 hours of initial placement.
- M. The complete sodded surface shall be true to finished grade, even and firm at all points.
- N. Sod on Slopes:
 - 1. Sod on slopes 2:1 or steeper shall be held in place with stakes to secure sod in place along the sloped surface.
 - 2. Stake shall be driven through the sod and into the soil until they are flush with the top of the sod.

3.04 SEED-STARTER STRAW MAT / BLANKET

- A. Prepare the area to be protected by raking the soil to a depth of 1 2 inches and removing large dirt clods, sticks and other obstructions.
- B. Apply seed and fertilizer, as specified for seed, and lightly rake into the soil.
- C. Roll out seed-starter mat/blanket over the prepared area making sure to remove any folds or wrinkles in the material. Do not install mat over existing vegetation. If necessary, the mat may be cut to size with sharp scissors or shears.
- D. Fasten material to the soil by installing three biodegradable plastic "BioSTAKEs" across the leading edge of the mat, per manufacturer's instructions, by driving them into the ground with a rubber mallet.
- E. Continue installation by the mat with "BioSTAKEs" per manufacturer's instructions, being sure to smooth out any wrinkles or folds. If the full roll is not used, secure the terminating end of the mat with three "BioSTAKEs", as done on the leading edge.
- F. For large areas requiring more than one mat, seam mats together by overlapping edges 2 3 inches and staking per manufacturer's instructions.
- G. For very steep slopes and ditches, bury leading edge (edge of mat at top of slope) in a 6 inch by 6 inch trench to prevent runoff water from getting under mat, per manufacturer's instructions.
- H. Immediately following installation, gently water entire area, thoroughly wetting both the mat and underlying soil. Keep soil moist for the first 30 to 60 days, or until uniform grass establishment is achieved.
- I. Leave mat and biodegradable plastic "BioSTAKEs" in place. They will degrade naturally as grass becomes established and typically can be mowed over within 30 to 45 days.

3.05 LAWN ESTABLISHMENT

- A. Provide daily maintenance until lawn is well established.
- B. Provide necessary lawn care including fertilizing, weed eradication, watering, mowing, removal of excess clippings and replacement of unsuitable sod.
- C. Watering:
 - 1. Keep soil moist during seed germination period.

- 2. Keep sod moist during first week after planting.
- 3. Supplement rainfall to produce total of 2 inches per day after germination of seed and after first week for sod.
- 4. Water planting when soil moisture is below optimum level for best plant growth.
- D. Establish period for lawns:
 - 1. Seeded Lawns:
 - a. Extend until uniform stand of grass shows over entire area.
 - 2. Sodded Lawns:
 - a. Until they have been mowed two times.
 - b. Each mowing shall be when height of grass reaches 3" high; cut back to 2-1/2".
 - c. Repair erosion damage after second mowing.

3.06 CLEAN-UP

- A. Remove trash and excess materials from the project site.
- B. Maintain paved areas in clean conditions.
- C. Remove barriers and signs from project site at termination of establishment period.

SUBMITTAL CHECK LIST

1. Product Data.

SECTION 02950 - TREES, PLANTS AND GROUND COVER

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnishing, installing and guaranteeing plantings as scheduled. Furnish labor, materials, equipment, special tools, supervision and services to perform all landscape work indicated, noted and detailed on the drawings and specified herein.
 - B. Section Includes:
 - 1. Trees and Plants.
 - 2. Wood Mulch.
 - 3. Stone or Rock Mulch.
 - 4. Topsoil.
 - 5. Fertilizer and Herbicide.
 - 6. Accessories.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- Section 01210 Cash Allowances
- Section 02110 Site Clearing
- Section 02200 Earthwork
- Section 02930 Lawns and Grasses
- Section 02951 Steel Maintenance Edging
- Section 02952 Aluminum Maintenance Edging
- Section 02953 L-Shaped Aluminum Maintenance Edging

1.03 QUALITY ASSURANCE

- A. Comply with the following standards:
 - 1. "American Standard for Nursery Stock," Latest Edition, American Association of Nurserymen.
 - 2. Plant Hardiness Zone Map, Latest Edition, Miscellaneous Publication No. 814 Agricultural Research Service, U.S. Department of Agriculture.
 - 3. Indiana Association of Nurserymen Standards.
 - 4. Indiana State Highway Standard Specifications, Latest Edition.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Deliver fertilizer in supplier's original unopened package.
 - 2. Pack, transport and handle plants with utmost care to protect against injury.
 - 3. Ball and burlap wrap and tie plants, or mud cover bare roots.
 - 4. Maintain plant stock in shade house for week after digging.
 - 5. Label trees and plants to remain legible min. 60 days.
 - 6. Do <u>not</u> prune trees before delivery.

1.05 JOB CONDITIONS

- A. Install trees, shrubs and ground cover planting before lawns are installed.
- B. Coordinate sequence of work with other trades.

1.06 WARRANTY

- A. Guarantee new plant material for one year after all plants are installed.
- B. During period of one year, replace dead, dying and unhealthy plants, and those whose appearance has been destroyed due to loss of branches and other damage.

- C. Guarantee replacement plants under this guarantee for one year from date of installation.
- D. Repair damage to other plants or lawns during plant replacement at no cost to Owner.
- E. Guarantee to include plant material, soil preparation, guying and maintenance.

1.07 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Submit manufacturer's published literature describing products.
 - 2. Submit schedule of planting materials or verification of items as scheduled on the Drawings.

PART 2 - PRODUCTS

2.01 <u>PLANTS</u>

- A. Planting Schedule:
 - 1. Indicates quantity, size and type of planting.
 - 2. If discrepancies between a listed quantity and plant quantities indicated on the plan, provide quantities as shown on the plan.
- B. Quality:
 - 1. True to type, name and variety, well-formed and shaped, with normal, well- developed branches and vigorous root system.
 - 2. Sound, healthy, vigorous, free from defects, disfiguring knots, sun-scald, abrasions, injuries, diseases, insect eggs, borers and all other forms of infections.
 - 3. Nursery grown in accordance with good horticultural practices.
 - 4. Grown under the same climate conditions as the location of this project for at least two (2) years prior to date of planting on this project.
 - 5. Plants which have been held in storage will be rejected if they show signs of growth during storage.
 - 6. Collected plants shall be taken from subgrade favorable to good root development.
 - 7. All collected material shall be clean, sound stock and shall be free from decaying stumps.
- C. Measurements:
 - 1. Size and grading conform to American Association of Nurserymen's standards unless otherwise specified.
 - 2. A plant shall be dimensioned as it stands it its natural position.
 - 3. For plants specified by a range of sizes, provide plants not less than the minimum size. Not less than 50% of the plants shall be as large as the average size specified.
 - 4. Large plants which have been cut back to the specified sizes will not be accepted.
 - 5. Take caliper measurements 6" above ground line for trees less that 4" caliper, 12" above ground lines for 4" caliper and larger.
 - 6. Provide plant materials which are matched specimens from a single block source.

2.02 <u>MULCH</u>

- A. Natural cypress, shredded, where wood mulch is indicated.
- B. White rolled river gravel rock mulch, where rock or stone mulch is indicated.
- C. Hay or straw, weed free, as specified in Indiana Highway Specifications 913.05.
- D. Peat Moss:
 - 1. Shredded, loose, free of mineral and waste matter.
 - 2. Minimum organic matter by weight, oven-dry: 85%.
 - 3. Ash content: 10% max.
 - 4. Moisture content: 35% max.

2.03 <u>TOPSOIL</u>

- A. Fertile, friable surface soil, free of materials toxic to plant growth.
 - 1. Classifiable as loam, silt loam, silty clay loam, or clay loam.
 - 2. PH range of 5.5 7.5.
 - 3. Organic content: 3% min., 20% max. (chromic acid reduction test).
 - 4. Free of grass, roots, stumps, brush and stone 2" or greater in diameter.

2.04 FERTILIZER AND HERBICIDE

- A. Soil fertilizer: Commercial 12-12-12.
- B. Granular plant food: Commercial 20-10-5.
- C. Planting tablets: Commercial fertilizer plant food tablets, "Agriform": 20-10-5. 5-25 gram weight.
- D. Herbicide: "Ronstar" or equal.

2.05 ACCESSORY MATERIALS

- A. Water: Free of oil, acids, alkalis, salts or any substance injurious to plants.
- B. Tree Paint: Standard horticultural antiseptic compound.
- C. Tree Wrap: Arboricultural wrapping paper, crepe surface, 4" wide, brown color, double layer.
- D. Porous Material: Gravel or coarse aggregate #2 ranging from 1 to 3 inches.
- E. PVC Pipe: 4" perforated or 4" solid.
- F. Miscellaneous Hardware: Eye bolts, cable clamps, turnbuckles, galvanized.
- G. Cable: Galvanized steel, 12 gauge.
- H. Hose: 2-ply reinforced rubber, 3/4" diameter, black or green.
- I. Pressure treated timbers and lumber: Osmose or Cuprinol treatment.
- J. Antidessicant: "Wilt Pruf", as manufactured by Nursery Specialty Products, Inc., or equal.
- K. Borer Control: Conform to article 611.12 of Highway Specifications.
- L. Sand: Medium textured, screened and washed.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Pits and trenches with flat, square bottom, a minimum 6" deeper than balls or roots, such that the root crown of plant is flush with finish grade prior to mulching to prevent crown rot.
- B. Width: Min. 1 ft. greater that diameter of ball or spread of roots of plants; and 2 ft. greater for trees.
- C. Lightly compact the soil well around the rootball of all trees and plants to place them in a straight and true vertical orientation, with the plants self-supporting.
- D. If deciduous trees cannot support themselves upright after planting, wrap and guy trees to secure them in position until they achieve the ability to be self-supporting. Protect all trees with tree stakes. Remove all staking within one year of growth.

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E. Prepare planting mix in pits under plants and as backfill.

3.02 PLANTING

- A. Setting Plants:
 - 1. Locate where indicated on drawing.
 - 2. Set trees plumb and brace in position.
 - 3. Ascertain locations of utility lines, electric cables and conduits, water lines, sprinklers to avoid disturbing subsurface lines and planting.
 - 4. Avoid overhead obstructions to large planting.
 - 5. Remove bindings and wrapping materials from top of balls and around trunks.
 - 6. Do not remove burlap from under balls.
- B. Back Filling:
 - 1. Use topsoil mixture containing 25 % peat moss.
 - 2. Fill all voids carefully.
 - 3. Avoid breaking or bruising roots.
 - 4. Tamp backfill firm to prevent settlement.
 - 5. Construct saucer of clay around plants as detailed.
 - 6. Water thoroughly.
 - 7. Add backfill if settling from watering occurs.
 - 8. Apply herbicide to soil surface after backfilling.
- C. Pruning:
 - 1. Perform pruning by experienced plantsmen using sharp tools.
 - 2. Prune after planting to remove broken or damaged branches and roots.
 - 3. Improperly pruned plants must be replaced.
- D. Mulching:
 - 1. Mulch shrubs to minimum 6" outside drip line of shrubs.
 - 2. Mulch trees and planting beds as shown on drawings.

3.03 PLANTING MAINTENANCE

- A. Begin maintenance immediately after planting and continue through one full growing season.
- B. Reset plants to upright position to proper grade as necessary.
- C. Remove and replace all dead plants.
- D. Water, remulch, fertilize, spray, tighten guy wires as required for keeping plants in healthy growing condition.

3.04 <u>CLEAN-UP</u>

- A. Remove debris and excess material from site.
- B. Clean spills from pavement and finished surfaces.
- C. Repair or replace damaged sodded or seeded areas.

SUBMITTAL CHECK LIST

1. Product Data.

SECTION 02952 - ALUMINUM MAINTENANCE EDGING

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services as required for all work related to the Aluminum Maintenance Edging as indicated, noted and detailed on the Drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02200 - Earthwork Section 02930 - Lawns and Grasses Section 02950 - Trees, Plants and Ground Covers

1.03 <u>WARRANTY</u> A. 15-year limited warranty from manufacturing defects in materials or workmanship.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Deliver in supplier's original unopened package.
 - 2. Pack, transport and handle plants with utmost care to protect against injury.
 - 3. Do not bend, twist or break.

1.05 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's published literature describing products.
 - 2. Submit manufacturer's installation procedures.

PART 2 - PRODUCTS

- 2.01 MAINTENANCE EDGING
 - A. Provide one of the following approved manufactured products:
 - 1. "PermaLoc Corporation", "CleanLine". 1-800-356-9660
 - B. Construction:
 - 1. Constructed for straight-line and gentle curve applications.
 - 2. Corrugated profile with exposed top edge.
 - 3. Shall have loops on side of section to receive stakes spaced approximately 2 feet apart along its entire length.

C. Material:

1. Extruded aluminum, 6063 alloy, T-6 hardness.

D. Size:

- 1. 3/16 inch thickness.
- 2. 4 inches high.
- 3. 8 feet and 16 feet lengths.

E. Connection Method:

- 1. Section ends shall splice together with a horizontal 1 inch wide x 4 inches long aluminum sliding connector.
- F. Stakes:
 - 1. Manufactured and supplied by same manufacturer and product set.
 - 2. 12 inch long standard stake.
 - 3. Stakes to interlock into preformed section loops.
 - 4. Provide longer, heavier gage stakes as required to firmly secure into ground as needed for its permanent intended use.
- G. Finish:
 - 1. Mill Finish Natural Aluminum.
 - 2. All edging, stakes, connectors and accessories to receive the same finish.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Ensure that all underground utility lines are located and will not interfere with the proposed edging installation before beginning work.
- B. Locate border line of edging with string or other means to assure border straightness and curves as designed.

3.02 INSTALLATION

- A. All installation procedures shall be per manufacturer's published Manufactured Guidelines.
- B. Set edging into trench with the horizontal base resting on compacted sub-base.
- C. Top of edging to be maximum of 1/2 inch above compacted finish grade on turf side.
- D. Loops for stakes are to be placed on the turf side.
- E. Drive stakes through edging loops until locked in place.
- F. Requires minimum of 3 stakes evenly spaced for each 8 feet section and 8 stakes evenly spaced for each 16 feet section.
- G. At square corners, notch cut the base only and form a continuous corner from a single piece. Do not abut two separate pieces at a corner.
- H. At a curved radius, either at corners or at angled runs, cut edging partially up through its height from bottom and turn back to desired angle to form rounded exposed radius.

3.03 BACKFILLING

- A. Backfill both sides of edging.
- B. Confirm and adjust if necessary that sections are securely held together.
- C. Compact backfill material along edging to provide top of edging at desired height above finish grade of turf.

3.04 <u>CLEAN-UP</u>

- A. Remove debris and excess material from site.
- B. Clean scraps and shavings from site.
- C. Repair or replace damaged sodded or seeded areas.

SUBMITTAL CHECK LIST 1. Product Data.

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, material, equipment, special tools, supervision and services required to deliver and properly place and complete all cast-in-place concrete work, both plain and reinforced, indicated, noted and detailed on the drawings and specified herein, including (but not limited to) reinforcing steel, anchor bolts, forms, and form removal.
 - B. 15 mil Vapor Barrier Systems throughout the project.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02200 – Earthwork Section 02750 – Concrete Paving and Curbs Section 03350 – Concrete Finishing

1.03 QUALITY ASSURANCE

- A. Comply with the following standards:
 - 1. ACI Standards (latest editions) for construction procedures. Including but not limited to:
 - a. Specifications for Structural Concrete for Buildings (ACI-301-05).
 - b. Recommended Practice for Hot Weather Concreting (ACI-305).
 - c. Recommended Practice for Cold Weather Concreting (ACI-306).
 - d. Building Code Requirements for Reinforced Concrete (ACI-318-02).
 - e. Guide To Evaluation of Strength Test Results Of Concrete (ACI-214).
 - f. ACI 302.2: Guide for Concrete Slabs that Receive Moisture-sensitive Flooring Materials.
 - 2. ASTM Standards (latest editions) for material specifications.
- B. Testing:
 - 1. See Section 01400 Quality Control and others as required herein.
 - 2. Pay costs of geotechnical engineer and testing laboratory approved by the Architect/Engineer, tests, inspections and necessary re-testing and re-inspection.
 - 3. Perform following tests, by certified concrete field technician.
 - a. Selection and securing of samples ASTM C172
 - b. Air content*.....ASTM C231 or ASTM C173
 - c. Slump test*.....ASTM C143
 - d. Cylinders Five 6" x 12"ASTM C31
 - e. Cylinder Test*.....ASTM C39
 - *Results to be reported by laboratory on test reports
 - 4. Concrete Cylinders:
 - a. Taken for each 50 cubic yards or each day's pour if less than 50 yards.
 - b. Remain undisturbed in a secure location on the site for 24 hours after which they shall be removed to the testing lab by laboratory personnel.
 - c. Two of the cylinders shall be tested at 7 days and two at 28 days for acceptance.
 - d. One cylinder shall be kept in reserve for 56-day test if needed.
 - e. Testing reports shall be made directly by laboratory as follows: -One copy to Architect
 - -One copy to Contractor
 - -One copy to Ready Mix Producer
 - f. Failure of the concrete to meet the specification requirement's may result in its complete removal and replacement at the Contractor's expense.
 - g. Cost of re-test, if any, will be at the Contractor's expense.

- C. Test Failure:
 - 1. In the event results do not meet the specification requirements, one or more of the following will be required at no cost to the Owner:
 - a. Windsor Probe test conforming to ASTM C803.
 - b. Core-boring test conforming to ASTM C42.
 - c. Load test in accordance with Chapter 20, ACI 318-05.
 - 2. In event Windsor Probe, core-boring or load test indicates concrete does not conform to specifications, contractor shall take such measurements as Architect prescribes or remove defective work as directed by Architect.
- D. Allowable Tolerances:
 - 1. The surface plane tolerance for cast slabs shall be such that depressions between high spots are not greater than 1/8" under a 10 foot straight-edge.
 - 2. Slabs on grade overall floor flatness and levelness minimums: $F_F = 35$ and $F_L = 25$.
 - 3. Minimum local values: $F_F = 25$ and $F_L = 15$.
 - Concrete floor tolerances shall be tested within 72 hours after floor installation. Testing procedures shall comply with ASTM E1155 "Standard Test Method For Determining F_F Floor Flatness and F_L Floor Levelness Numbers". An Independent Testing Laboratory shall be retained by the Contractor to provide floor tolerance testing.
- E. Footings and Slabs On Grade:
 - 1. All footing excavations shall be inspected by the geotechnical engineer and testing laboratory before concrete is placed. The adequacy of the soil shall be determined.
 - 2. Footings and slabs on grade shall bear on firm natural soil, or on properly compacted engineered fill over firm natural soil, as recommended by the geotechnical engineer.
 - 3. Engineered fill and backfill under all footings and slabs on grade shall be placed and compacted as recommended by the geotechnical engineer.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Store materials to prevent contamination, deterioration, and weather damage.
- B. Deliver ready-mixed concrete to destination in conformance with ASTM C94.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather:
 - 1. Comply with ACI 306.
 - 2. Temperature of concrete when placed shall not be less than 50°F.
 - 3. Maximum concrete temperature 90°F, minimum 50°F per ASTM C94, for duration of curing period.
 - 4. Concrete shall be placed within 90 minutes of batch time.
- B. Hot Weather:
 - 1. Comply with ACI 305.
 - 2. Temperature of concrete when placed shall not be greater than 90°F.
 - 3. Maximum concrete temperature 90°F, for duration of curing period.
 - 4. Concrete shall be placed within 90 minutes of batch time. Shorter time limits may apply when air temperature is in excess of 90°F.
 - 5. Protect from rapid evaporation by spraying or sheeting.
- C. The Contractor shall consider the timing required for placement of concrete for the entire project. He shall include in his bid all work and costs associated with the proper protection, procedures and materials required for the weather and environmental conditions for the time of year the work is to

occur. No additional costs will be borne by the Owner, Architect or their consultants for failure by the Contractor to include these costs in the bid or make reasonable assumptions as to the requirements needed or limitations that may be incurred.

1.06 SUBMITTALS

- A. Concrete Mix Designs:
 - 1. A separate mix design for each class and type of concrete is required.
 - a. Include literature for admixtures.
 - b. Include applicable compliance with referenced ASTM number.
- B. Reinforcing Steel Shop Drawings:
 - 1. Indicate all reinforcing steel sizes, locations, supports, details, lengths laps and bends.
 - 2. Indicate all reinforcing strengths and quantities.
- C. Vapor Barrier Product Data:
 - 1. Submit manufacturer's published literature describing products and system.
 - 2. Submit manufacturer's installation procedures and MSDS sheets.
- D. Curing and Sealing Materials Product Data:
 - 1. Submit manufacturer's published literature describing products.
 - 2. Submit manufacturer's installation procedures and MSDS sheets.

PART 2 - PRODUCTS

2.01 MIX DESIGNS

- A. Design mix with appropriate adjustments for air content and aggregate proportions.
- B. Compressive Strength (minimum) reached by 28 days:
 - 1. 4,000 psi: All concrete for general use, interior and exterior, unless indicated otherwise.
 - 2. 3,500 psi: Curbing.
- C. Air Entrainment:
 - 1. For exterior concrete exposed to weather: Controlled between 4.5% (+/- 1%) by volume.
 - 2. For interior slabs and concrete: no air added.
 - 3. Comply with ASTM C260.
- D. Slump:
 - 1. Footings: 3 inches +/- 1 inch.
 - 2. Foundation walls: 4 inches +/- 1 inch.
 - 3. Interior slabs on grade and slabs over metal decking: 4 inches +/- 1 inch.
 - 4. Exterior slabs, pads, walks, steps and stoops: 4 inches +/- 1 inch.
 - 5. Curbs: 1 inches +/- .5 inch.
 - 6. When water reducing admixtures are used: 7.0 inches maximum.
- E. Water / Cement Ratio:
 - 1. Maximum water to cement ratio for all interior slabs (on grade or over metal decking) to be 0.50.
 - 2. Regardless of any contrary notes on Drawings, in no case shall the water to cement ratio exceed this amount for slabs scheduled to receive floor finishes. Provide admixtures as required for weather conditions at time of pour.
 - 3. If water to cement ratio exceeds this amount in quality control test, that area of slab must be removed at contractor's expense, the mix design corrected as required, and a new slab installed

which complies with the proper water to cement ratio. All admixtures required are to be included in the corrected mix design submittal.

F. Cement Content:

1. Minimum cement content: 564 lb. per cu. yd., unless the supplier can substantiate with test data that a lower content is acceptable to achieve specified compressive strength per mix design.

2.02 CONCRETE MATERIALS

- A. Portland Cement:
 - 1. ASTM C150-05, Type 1.
 - 2. One brand shall be used throughout the work.
- B. Air Entraining Cement:
 - 1. ASTM C150, Type IA or IIIA.
- C. Aggregates:
 - 1. ASTM C33:
 - 2. Coarse Aggregates:
 - a. Clean, tough, durable fragments of crushed stone, uncrushed gravel or dredged river gravel free from dirt or objectionable matter.
 - b. Size: Maximum 1-1/2" at footings; 1" in slabs.
 - 3. Fine aggregate: Natural sand; clean, sound, hard, durable particles; gradation size No. 1.
- D. Water:
 - 1. Clean, potable and free from injurious amounts of oil, acids, alkalies, organic matter or deleterious substances.
- E. Fly Ash/Pozzolans:
 - 1. ASTM C618.
 - 2. Class F or C.
 - 3. Content shall not exceed 20% by weight of the total cementitious content of the mix.
 - 4. If used in conjunction with Ground Granulated Blast Furnace Slag, the total content of Fly Ash and Ground Granulated Blast Furnace Slag shall not exceed 50% by weight of the total cementitious content of the mix.
- F. Ground Granulated Blast Furnace Slag:
 - 1. ASTM C989.
 - 2. Content shall not exceed 30-40% by weight of the total cementitious content of the mix.
 - 3. If used in conjunction with Fly Ash, the total content of Fly Ash and Ground Granulated Blast Furnace Slag shall not exceed 50% by weight of the total cementitious content of the mix.

2.03 ADMIXTURES

- A. Air Entraining Agent:
 - 1. ASTM C260.
 - 2. Neutralized vinsol resin solution.
- B. Water Reducing Agent:
 - 1. ASTM C494.
 - 2. Types as required to provide controlled setting and/or controlled rate of hardening without increase in water/cement ratio or loss in strength.

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- C. Chemical Accelerators and Retarders:
 - 1. ASTM C494.
 - 2. Permitted only upon approval of Architect/Engineer.
- D. Prohibited Admixtures:
 - 1. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are NOT permitted.

2.04 <u>MIXING</u>

- A. Measure and mix materials for ready mixed concrete in conformance with ASTM C94.
- B. Take into account free moisture in the aggregate weight.

2.05 CURING MATERIALS

- A. Provide one of the following acceptable products:
 - 1. "BASF/Sonneborn"; Kure-N-Seal WB.
 - 2. "Foxfire International"; Foxfire P-1007 Sealer.
 - 3. "Master Builders"; Masterseal.
 - 4. "W.R. Grace"; Clear Seal.
 - 5. "W.R. Meadows/Sealtight";, VOCOMP-20.
 - 6. "The Euclid Chemical Company"; Super Diamond Clear VOX.
- B. Liquid Membrane: AASHTO M-148 and ASTM C309, Type 1, class A and B.
- C. Waterborne acrylic polymer in a co-solvent emulsion, transparent, quick drying, non-yellowing.
- D. Compatible with flooring adhesives.

2.06 METAL REINFORCEMENT

- A. Bars: ASTM A 615 Grade 60, Type "S", deformed.
- B. Deformation: ASTM A305.
- C. Stirrups and Column Ties: ASTM A 615 Grade 60.
- D. All Other Reinforcement: ASTM A 615 Grade 60, with supplementary requirements (S1).
- E. Welded Wire Reinforcement (WWR), Welded Wire Fabric (WWF), Welded Wire Mesh (WWM):
 1. ASTM A 185.
 - 2. 6 x 6 W1.4 x W1.4, or as otherwise indicated.
 - 3. All splices shall be Class B tension lap splice.
- F. Metal Accessories:
 - 1. Including spacers, chairs, ties and other devices necessary for properly assembling, placing, spacing and supporting all reinforcement in place shall be provided.
 - 2. Ties shall be of such type as to leave no metal closer than 3/4" from concrete surface.

2.07 VAPOR BARRIER

- A. Provide one of the following acceptable products:
 - a. "Stego Industries"; Stego Wrap.
 - b. "Reef Industries"; Vapor Guard.
 - c. "Viper"; VaporCheck II.

- d. "W.R. Meadows"; Perminator.
- e. "Raven Industries"; Vaporblock VBLP15.
- B. 15 mil polyethylene or polyolefin film slab underlay system.
- C. System shall be comprised of manufacturer's tested assembly of vapor barrier film, seaming tape and penetration sealer tape, sealant or mastic.
- D. Shall meet the following minimum requirements:
 - 1. Classification: Class A per ASTM E1745-11.
 - 2. Tensile Strength: 70 lbs/in per ASTM E154 / ASTM D882.
 - 3. Puncture Resistance: 2,200 grams per ASTM D1709.
 - 4. Permeance: Shall not exceed .01 perms as tested after conditioning per ASTM E154. (as per the definition of a vapor barrier in lieu of a vapor retarder).

2.08 EXPANSION JOINT FILLER

- A. Provide one of the following acceptable products:
 - 1. "BASF/Sonneborn"; Expansion-Joint Filler.
 - 2. "W.R. Meadows/Sealtight"; Fibre Expansion Joint.
- B. Pre-molded joint filler strips of resilient, flexible, closed cell, compressible, re-expanding, non-extruding material backing for sealants.

2.09 NON-SHRINK GROUT

- A. Provide one of the following acceptable products:
 - 1. "Euclid Chemical Co.", NS Grout.
 - 2. "BASF", Masterflow 713.
- B. Pre-mixed, factory-packaged, non-staining, non-shrink, non-metallic, non-gassing mortar grouting compound.
- C. ASTM C827, C191, C109, and C1107.
- D. Minimum compressive strength: 5,000 psi
- E. Provide test data that grout when placed at a fluid consistency shall achieve 95% bearing under a 4' x 4' base plate.

2.10 BONDING AND REPAIR MATERIALS

- A. Bonding Compounds:
 - 1. Polyvinyl acetate type.
 - 2. Provide one of the following acceptable products Rewettable:
 - (Use only in areas not subject to moisture):
 - a. "Euclid Chemical Co."; Euco Weld.
 - b. "Larsen Co."; Weldcrete.
 - 3. Provide one of the following acceptable products Non-rewettable polymer modified compound: a. "Euclid Chemical Co."; Euco-Bond.
- B. Epoxy Adhesive:
 - 1. Two component, 100% solids, 100% reactive compound.
 - 2. Suitable for use on dry or damp surfaces.
 - 3. Provide one of the following acceptable products:

- a. "Euclid Chemical Co."; Euco Epoxy No. 452MV.
- b. "Euclid Chemical Co."; Euco Epoxy No. 620.
- c. "Silka Chemical Corp."; Sikadure Hi-Mod.

2.11 FORM WORK

- A. Provide formwork to conform to shape, lines and dimensions of members indicated on Drawings.
- B. Construct formwork sufficiently tight to prevent leakage.
- C. Construct formwork for exposed smooth surfaces of plywood or other similar smooth material.
- D. Bevel exposed concrete corners 3/4 inch unless otherwise indicated on drawings.
- E. Form Coatings:
 - 1. Approved commercial formulation of proven performance that will not bond with concrete surfaces.
 - 2. Shall not impair subsequent treatment and curing of, or otherwise adversely affect, concrete surfaces.
 - 3. Non-staining.
 - 4. Apply before reinforcing steel is placed.
- F. Tolerances:
 - 1. ACI 347.
- 2.12 DRAINAGE FILL / GRANULAR FILL BELOW SLABS-ON-GRADE A. See Section 02200 – Earthwork.

2.13 PRECAST PIPE BOLLARD CAP

- A. Symmetrically domed profile utilizing minimum 5,000 psi fiber reinforced cementitous material.
- B. Provide one of the following approved products:
 - 1. "TopGard, LLC"; TopGard.

PART 3 - EXECUTION

- 3.01 PREPARATION
 - A. Prior to placement of any permanent concrete, footings, slabs or other construction, remove all existing surficial fill, topsoil, organic material, wet soil, loose soil, undesirable soils, abandoned concrete and other materials to the extent indicated by the geotechnical engineer.
 - B. Prior to placing concrete, notify all trades to be certain that all sleeves, conduit, chases, etc. are installed and properly located. . Coordinate all openings and chases required in the concrete work and provide all items to be cast into the concrete pour.
 - C. Ensure slab subgrade is well drained, of adequate, uniform load bearing nature, and not muddy, soft or frozen.
 - D. Dampen subgrade ahead of concreting.
 - E. Test Below-slab pipes prior to casting concrete.
 - F. Footing excavations shall be drained and firm at time of concrete placement.

G. Vapor Barrier:

- 1. Shall be properly installed and ready to receive concrete.
- 2. Damp proof slab on grade with film underlay between fill and concrete.
- H. Verify reinforcement and anchors, expansion joint material and embedded items are secured in position. Install anchor rods, dovetail slots and other embedded items as required for support of other work that is attached to or supported by cast-in-place concrete.
- I. Joints in Work:
 - 1. Slabs and footings shall have no horizontal joints.
 - 2. Any stop in concrete work shall be made with keyed vertical bulkheads.
 - 3. All reinforcing shall continue through the joint.
- J. The Architect or his representative shall be given 24 hours notice to inspect placement of reinforcing steel before concrete is placed.
- K. Coordination With Floor Finishes:
 - 1. Contractor is responsible for determining maximum floor moisture levels and ph levels acceptable to floor finish manufacturers and installers.
 - 2. Schedule concrete floor slab pours to allow adequate time for moisture to evaporate prior to installing finish flooring.
 - 3. Provide concrete with a maximum water to cement ratio of 0.50.
 - 4. Allow minimum 3 months curing time before installing floor finish materials.
 - 5. Do not densify surfaces of slabs to receive moisture sensitive floor finishes to the point that the slab cannot dry to the surface.

3.02 VAPOR BARRIER

A. Vapor Barrier:

- 1. Install the entire system in accordance with ASTM E1643-Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- 2. Unroll vapor barrier film over entire area of aggregate or compacted earth base as indicated.
- 3. Smooth all surfaces and keep clean and free of debris, contamination, tears or damage.
- 4. Overlap all seams, ends and edges a minimum of 6" in direction of pour.
- 5. Seal all seams using manufacturer's sealing tape, sealant or mastic.
- 6. Seal all penetrations through film using manufacturer's sealing tape, sealant or mastic, or a combination as required to fully seal around all penetrating items.
- 7. Correct any damages or tears in film materials and seam systems to protect integrity of system.
- 8. Provide temporary overlayments as required to protect vapor barrier during slab installation.

3.03 REINFORCEMENT

- A. Provide bar supports and spacers in accordance with ACI Detailing Manual.
 - 1. All bar supports in areas where concrete will be exposed shall have plastic feet.
 - 2. Precast concrete blocks, 3"x3"x3", 3000 psi, shall be used to support reinforcing off the ground.
 - 3. At all other locations, chairs or standees shall be used.
- B. Detailing, fabrication and placing of reinforcing shall conform to applicable provisions of ACI 315 and ACI 318.
- C. Spread bars around small openings and sleeves in slabs and walls where possible and where bar spacing will not exceed 1-1/2 times the normal bar spacing.

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- D. Discontinue bars at large openings where necessary and provide an area of reinforcement equal to the interrupted reinforcement distributing 1/2 of this reinforcement each side of the opening (Class B tension lap splice).
- E. Holes larger than 12 inches in any direction shall have (1) #5 x 5'-0" long diagonal bar in both faces at each corner, whether indicated, detailed or not.
- F. Pier reinforcement shall be doweled to the footing.
 Provide dowels equal in size, number and grade to the pier reinforcement, unless otherwise indicated.
 Dowels shall be hooked 90 degrees at the bottom level of footing reinforcement.
 Dowels shall be lapped with the pier reinforcement.
- G. Pier reinforcement shall be the same size, number and grade as the column/pilaster reinforcing, unless otherwise indicated.
- H. Reinforcing bars and welded wire fabric or mesh shall be placed and secured prior to pouring concrete.
- I. Minimum concrete protection for steel reinforcement:
 - 1. 3/4" for elevated slabs and walls not exposed to earth or weather.
 - 2. 1-1/2" for walls exposed to weather.
 - 3. 3" for footings and other concrete cast against earth.
 - 4. Comply with ACI 318 and 301 requirements for minimum concrete cover for reinforcement.

3.04 CONVEYING AND DEPOSITING

- A. Concrete for footings shall be placed the same day excavations are opened. If this is not possible, steps shall be taken to properly and adequately protect the excavation and maintain its integrity and levels of acceptability.
- B. Convey concrete from mixer to form as rapidly as practicable, by methods which will prevent segregation or loss of materials.
- C. Vertical drops: maximum three feet free fall.
- D. Place concrete as nearly as possible to its final position at a rate so it remains plastic and flows readily into position. Proceed with placing as a continuous operation until unit of construction is complete. Use vertical construction joints to avoid horizontal joints between concrete placements.
- E. Do not use retempered concrete or concrete partially hardened or contaminated with foreign material.
- F. Ensure forms and conveyance equipment are clean and free of ice, water, debris and hardened concrete.
- G. All vertical concrete surfaces shall be formed, including all footings.
- H. Provide shear keys in the top of all wall and column footings at concrete walls.
- I. Minimum depth for all footings for exterior walls to be 24" below finish grade.
- J. No water may be added to any concrete.

3.05 <u>CURING</u>

A. Formwork shall remain in place five (5) days before being removed. Remove all formwork in such a

manner and at such time as to not damage concrete surfaces and to ensure complete safety to the structure.

- B. Perform curing of concrete of slabs and other horizontal surfaces by moist curing or by use of curing compounds.
- C. Moist Curing:

Moist curing shall be performed by application of polyethylene sheeting per ASTM C171 or continuous wetting of burlap or other type of absorptive cover or mat. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers. Cure for seven days.

- D. Curing Compounds:
 - 1. Apply curing compound immediately following completion of finishing after water sheen has disappeared.
 - 2. Spray or brush uniformly in a single coat immediately after final finishing operation, at rate recommended by manufacturer.
 - 3. Do not use material which discolors concrete or inhibits adherence of other materials.
- E. Meet requirements of hot and cold weather concreting.
- F. For slabs to receive moisture sensitive floor coverings, cure in accordance with recommendations of ACI 302.2.
- G. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moistureretaining cover, unless otherwise directed.
- H. Do NOT use membrane curing compounds on surfaces which are to receive coatings applied directly to concrete surfaces (liquid floor hardeners, waterproofing, dampproofing, membrane roofing, flooring, concrete coatings, painting, staining, etc.) unless specifically permitted by the Architect, and written documentation is provided by the coating manufacturer that such compound will not have an adverse affect on adhesion, longevity, durability, performance, or any other issue of the product.

3.06 COLD WEATHER REQUIREMENTS

- A. Temperature of concrete when placed shall be not less than 50° F.
- B. Temperature of concrete shall be maintained above 50° F and below 90° F for duration of curing period
- C. Procedures shall be in accordance with ACI 306. Concrete shall be placed within 90 minutes of batch time.

3.07 HOT WEATHER REQUIREMENTS

A. Temperature of concrete when placed shall be less than 90° F.

- B. Concrete shall be placed within 90 minutes of batch time. Shorter time limits may apply when air temperature is in excess of 90° F.
- C. Procedures shall be in accordance with ACI 305.

3.08 <u>CONSOLIDATION</u>

- A. Consolidate concrete with high-frequency vibrators.
- B. Insert vibrators into each 18" lift at intervals not to exceed 12". Insert for sufficient duration to produce

complete consolidation without over-vibrating to cause separation.

C. Remove excess free water collecting on the surface during the vibration before finishing.

3.09 <u>JOINTS</u>

- A. Locate and construct all joints as shown on the Drawings, or if not shown, as specified herein, or if not specified, as directed by Architect.
- B. Construction Joints.
 - 1. May be substituted for control or contraction joints in slabs on grade at the indicated locations of such joints or as approved by the Architect.
 - 2. Provide keyed joints between all cast sections of slabs on grade.

C. Control Joints:

- 1. Depth: 1/3 thickness of slab or 1" minimum depth, whichever is greater.
- 2. Width: Maximum 3/16".
- 3. Spacing:
 - a. Slabs:
 - 1) 4" slab = 12'-0" o.c. maximum.
 - 2) 5" slab = 13'-0" o.c. maximum.
 - 3) 6" slab = 14'-0" o.c. maximum.
 - 4) 8" slab = 17'-0" o.c. maximum.
 - 5) At greater frequency and other locations as indicated on Drawings.
 - b. Walks:
 - 1) 4'-0" o.c. or the width of the walk whichever is less.
 - 2) At greater frequency and other locations and patterns as indicated on Drawings.
 - c. Walls:
 - 1) At 20'-0" o.c. each way, maximum.
 - 2) At greater frequency and other locations as indicated on Drawings.
- 4. Wet cut joints immediately after concrete set and able to support machine and personnel. Maximum 24 hours after placing.
- 5. Saw cut joints are <u>not</u> acceptable unless authorized in writing by Architect. If permitted, joints shall be made using the early entry dry-cut method.
- 6. For control joints scheduled to receive joint fillers, comply with joint filler manufacturer's recommendations for depth and preparation of joint.
- D. Expansion Joints: Install 1/2" expansion joint filler at concrete pavement joints; hold down below surface or cut the required depth for sealant.
- E. Carry reinforcement across joints in slabs except at expansion joints.

3.10 FINISHING: CONCRETE FINISH SCHEDULE

- A. Interior:
 - 1. Hard trowel smooth finish.
- B. Exterior:
 - 1. Stoops: Hard trowel smooth finish.
 - 2. Walks: Broom finish. (Hard trowel smooth at expansion and control joints).
 - 3. Steps: Vertical surfaces rubbed; horizontal surfaces broom finish.
- C. Broom finish by drawing broom across surface, transversely after hard troweling (not just floating).

3.11 BOLLARD CAP

A. After filling pipe bollard with concrete, install precast bollard cap while concrete is still wet.

3.12 PROTECTION

- A. Protect fresh concrete from heavy rains, extreme air temperatures, injurious sun, mechanical injury and other deleterious elements.
- B. If scaling occurs from failure to take protective precautions, repair or replace damaged concrete.

3.13 PATCHING

A. Do not patch any surface until examination is made by the Architect and permission is given.

SUBMITTAL CHECK LIST

- 1. Concrete Mix Designs.
- 2. Reinforcement Steel Shop Drawings.
- 3. Vapor Barrier Product Data.
- 4. Curing and Sealing Materials Data.

SECTION 03540 - SELF-LEVELING CONCRETE FLOOR UNDERLAYMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, material, equipment, special tools, supervision, and services required to prep substrate and properly place self-leveling concrete floor underlayment as indicated on drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 09300 – Tile

1.03 QUALITY ASSURANCE

A. Installer's Qualifications: Installation of underlayment shall be by an applicator authorized by the manufacturer using manufacturer's approved mixing and pumping equipment.

1.04 DELIVERY, STORAGE AND HANDLING

A. General Requirements: Materials shall be delivered in their original, unopened packages, and protected from exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.05 SITE CONDITIONS

A. Environmental Requirements: Before, during and after installation of underlayment, building interior shall be enclosed and maintained at a temperature above 50 degrees F (10 degrees C) and below 100 degrees F (37.7 degrees C) until structure and subfloor temperature are stabilized.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cementitious Self-Leveling Poured Floor Underlayment: Floor underlayment compound to be Level-Right Self-Leveling Floor Underlayment as manufactured by Maxxon Corporation Gypcrete or approved equivalent.
- B. Sand Aggregate: Sand shall be silica aggregate meeting requirements of manufacturer.
- C. Mix Water: Potable, free from impurities.
- D. Subfloor Primer: Underlayment manufacturer's recommended primer as required.
- E. Sealer: Underlayment manufacturer's recommended sealer as required.

2.02 MIX DESIGNS

A. General Requirements: Underlayment mix proportions and methods shall be in strict accordance with product manufacturer recommendations.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Condition and Cleaning of Subfloor: Subfloor shall be structurally sound. Contractor shall clean subfloor to remove mud, oil, grease, and other contaminating factors.
- B. Leak Prevention: Fill cracks and voids with a quick setting patching or caulking material where leakage of underlayment could occur.
- C. Priming Subfloor: Prime concrete subfloor using the manufacturer's recommended primer. Priming instructions vary according to the porosity of the concrete, multiple coats may be necessary.
- D. Expansion Joints: Allow joints to continue through the underlayment at the same width.

3.02 APPLICATION OF SELF-LEVELING UNDERLAYMENT

- A. Scheduling: Application of underlayment shall not begin until the building is enclosed, including roof, windows, doors, and other fenestration.
- B. Application: Place underlayment from 3" (76 mm) to featheredge. Spread and float to a smooth surface. Except at authorized joints, place underlayment as continuously as possible until application is complete so that no slurry is placed against underlayment that has obtained its initial set.
- C. Drying: Contractor shall provide continuous ventilation and adequate heat while curing.

3.03 PREPARATION FOR INSTALLATION OF FLOORING

- A. Sealing:
 - 1. Seal all areas according to manufacturer's recommendations.
 - 2. Verify sealer compatability with flooring adhesives prior to installation.
- B. Refer to manufacturer's guidelines for additional information regarding flooring installation.

3.04 FIELD QUALITY CONTROL

- A. Slump Test: Underlayment mix shall be tested for slump as it is being pumped using a 2 inch by 4 inch (50 mm by 101 mm) cylinder resulting in a patty size of 9 1/2 inches (241 mm) plus or minus 1 inch (25 mm) diameter.
- B. Field Samples: At least one set of 3 molded cube samples shall be taken from each day's pour during the underlayment application. Cubes shall be tested as recommended by the manufacturer in accordance with modified ASTM C 109. Test results shall be available to architect and/or contractor upon request from applicator.

3.05 PROTECTION

A. Protection From Heavy Loads: During construction, place temporary wood planking over underlayment wherever it will be subject to heavy wheeled or concentrated loads.

SECTION 04100 - MORTAR

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Furnish labor, materials, equipment, special tools, supervision and services required to provide and complete all mortar for setting of all masonry work on this Project as indicated, noted, detailed and scheduled on the drawings and specified herein.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 04150 - Masonry Accessories Section 04160 - Masonry Reinforcement Section 04210 - Face Brick Masonry Section 04220 - Concrete Unit Masonry Section 04420 - Cut Stone Section 04510 - Masonry Protection and Cleaning

1.03 <u>REFERENCES</u>

- A. Publications of the following Institutes, Associates, Societies and Agencies are referred to in this section:
 - 1. American Society for Testing and Materials (ASTM).

1.04 SUBMITTALS

- A. Manufacturer's Literature:
 - 1. Materials description of cement.
 - 2. Manufacturer's test data for mortar mixtures.
- B. Samples:
 - 1. Manufacturer's actual sample bars of entire selection of standard mortar colors.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver mortar materials, except sand, in full, unopened bags.
 - 1. Store packaged materials off the ground and keep covered and protected from weather until used.
- B. Deliver and stockpile sand in vicinity of the approved batch mixing location.
- C. Pre-mixed sand/mortar, silo type batch plants may be used on site.
- D. Use pipe or hose to provide clean fresh water at the batch mixing location.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Masonry Cement:
 - 1. Provide one of the following approved products:
 - a. "Essroc", Brixment.
 - b. "Cemex", Kosmortar.
 - c. "Lafarge", Masonry Cement.
 - 2. Masonry Cement shall comply with the requirements of ASTM C91.
 - 3. Portland Cement, Type 1, shall comply with the requirements of ASTM C150.

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B. Hydrated Lime:

- 1. To comply with the requirements of ASTM C207.
- C. Aggregates to Setting Mortar:
 - 1. Shall comply with the requirements of ASTM C144.
 - 2. For joints 1/4 inch thick or less, 100% shall pass No. 8 sieve and 95% shall pass No. 16 sieve.
- D. Water:
 - 1. Clean, fresh and potable.
 - 2. Free from injurious amounts of oils, acids, alkalies, organic matter or deleterious substances.
- E. Water Repellent:
 - 1. Provide one of the following approved products:
 - a. "Grace Construction Products"; Dry-Block.
 - b. "BASF"; Rheopel Plus.
 - c. "ACM"; RainBloc.
 - d. "Krete"; HQ.
 - 2. Use for all mortar on exterior concrete masonry walls.
- F. Silo Batch Plant:
 - 1. As approved by the Architect.

2.02 <u>MIXES</u>

- A. Mortar Mixes:
 - 1. All components to be pre-measured, pre-packaged and pre-mixed by the manufacturer.
 - 2. Ready-mixed mortar, prepared offsite and delivered for storage in tubs, will <u>NOT</u> be acceptable.
- B. Type S Mortar:
 - 1. 1,800 psi minimum, high compressive strength tested in accordance with ASTM C270.
 - 2. For use at all exterior masonry walls.
 - 3. For use at all at grade and below grade masonry walls.
 - 4. For use at all interior, reinforced masonry walls.
- C. Type N Mortar:
 - 1. 750 psi minimum, medium compressive strength tested in accordance with ASTM C270.
 - 2. For use at all interior, non-reinforced masonry walls.
 - 3. For use at all exterior veneers, brick and stone.
- D. No chemical admixtures shall be added to the mortar without the express permission of the Architect.
- E. Mortar Color:
 - 1. Tinted, colored mortar.
 - 2. Color as selected by Architect from manufacturer's entire standard selection.
 - 3. Separate mortar colors may be selected for differing materials, or differing colors or textures of the same materials, throughout the project.

PART 3 - EXECUTION

3.01 <u>MIXING</u>

- A. Mix mortar mix and water proportions by volume per manufacturer's requirements.
- B. Mix mortar in an approved drum type batch mixer to a uniform color, texture and consistency.
 - 1. Measure ingredients carefully and completely empty drum between batches.
 - 2. Hand mixing will not be permitted.
- C. Add water repellent to mortar per manufacturer's instruction.

3.02 CONSISTENCY

- A. Mortar shall be consistent to the satisfaction of the mason and may be re-tempered on the boards by adding small amounts of water and remixing if stiff due to evaporation.
- B. Do not use mortar that has become stiff due to hydration or that has been mixed more than two hours.

SUBMITTAL CHECK LIST

- 1. Manufacturer's Literature.
- 2. Color samples.

SECTION 04150 - MASONRY ACCESSORIES

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. All labor, materials, equipment, special tools, supervision, and services required to provide and complete all masonry accessories for all masonry work on this Project as indicated, noted, detailed, and scheduled on the Drawings or specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 04100 - Mortar Section 04160 - Masonry Reinforcement Section 04210 - Face Brick Masonry Section 04220 - Concrete Unit Masonry Section 04420 - Cut Stone Section 04510 - Masonry Protection and Cleaning
- 1.03 <u>DELIVERY, STORAGE AND HANDLING</u>
 A. Storage: Store steel accessories off of the ground, on blocking, with waterproof cover.
- 1.04 QUALITY ASSURANCE
 - A. All work shall comply with ACI-530 and recommendations of The Masonry Society.
 - B. Hot dipped galvanizing after fabrication per ASTM A153 (1.5 oz./ft.).

1.05 SUBMITTALS

- A. Manufacturer's Literature:
 - 1. Manufacturer's data sheets, cutsheets and materials description.
- B. Samples:
 - 1. Provide actual sample of unit as requested by the Architect.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. Provide products, as approved by the Architect, by one of the following acceptable manufacturers:
 - 1. Hohmann & Barnard (H&B).
 - 2. Masonry Technology Inc. (MTI).
 - 3. Advanced Building Products.
 - 4. Sandell Manufacturing.
 - 5. A-A Wire Products Company.
 - 6. Baltimore Birmingham.
 - 7. DUR-O-WALL, Inc.
 - 8. Heckman Building Products, Inc.
 - 9. Masonry Reinforcing Corp. of America.
 - 10. National Wire Products Corp.

2.02 <u>MATERIALS</u>

- A. Weep Holes:
 - 1. Provide one of the following approved products:
 - a. "H&B", #QV-Quadro Vent.
 - b. "MTI", Cavity Vent.
 - c. "Advanced Building Products", Mortar Maze.
 - d. "Sandell Manufacturing", Mortar Net Weep Vents.

- B. Control Joints:
 - 1. Provide one of the following approved products:
 - a. "H&B", RS Series.
 - b. "BoMetals, Inc.", BCJ Series.
 - 2. Preformed elastomeric rubber, with shear keys and flanges.
- C. Veneer Wall Ties:
 - 1. At veneer cavity walls with wood stud, concrete, or concrete masonry back-up (with continuous insulation):
 - a. Provide one of the following approved products:
 - 1) "Heckman Building Products", Pos-I-Tie wire ties with "Tapcon" screws.
 - b. Length as required by manufacturer for full extension into substrate material.
 - c. Hot dipped galvanized, typical.
 - d. Stainless steel, type 304, at stone veneer.
 - 2. At veneer cavity walls with wood stud, or poured concrete back-up (with continuous insulation):
 - a. Provide one of the following approved products:
 - 1) "H&B", #DW-10 with #VWT vee wall ties.
 - b. Hot dipped galvanized.
 - 3. At veneer cavity walls with concrete masonry back-up (with continuous insulation):
 - a. See Specification 04160 Masonry Reinforcement.
- D. Stone Anchors:
 - 1. Provide one of the following approved products:
 - a. "H&B", #303 corrugated veneer tie and #305 dovetail slot.
 - 2. 2-piece dovetail design comprised of continuous dovetail slot and corrugated masonry tie.
 - 3. Stainless steel, type 304.
- E. Column Anchors:
 - 1. Provide one of the following approved products:
 - a. "H&B", #359-FH Weld-On Tie with #302W Column Web Tie.
 - 2. Hot dipped galvanized.
- F. Beam Anchors:
 - 1. Provide one of the following approved products:
 - a. "H&B", #357.
 - 2. Hot dipped galvanized.
- G. Mortar/Grout Screen:
 - 1. Provide one of the following approved products:
 - a. "H&B", #MGS.
 - 2. 1/4" square microfiliment screen.
 - 3. Polypropylene polymer, non-corrosive.
- H. Rebar Positioners:
 - 1. Provide one of the following approved products:
 - a. "H&B", #RB and #RB-Twin.
 - 2. Z-shaped wire bridge.
 - 3. 9 gauge wire.
 - 4. Size for block width and core dimension as required.
 - 5. Hot dipped galvanized.

- I. Masonry Slip Joint:
- 1. Provide one of the following approved products:
 - a. "H&B", #NS.
- 2. Placed in masonry coursing below relieving angle.
- 3. Closed cell neoprene sponge.
- 4. 3/8" thickness to match mortar joint coursing x width of entire masonry unit.
- 5. Adhesive backing, one side only.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Weep Holes:
 - 1. Install in strict accordance with the manufacturer's published recommendations.
 - 2. Provide in head joints in first course immediately above all flashing, at spacing as indicated on the drawings. If not indicated, provide at 32" o.c.
 - 3. Keep area above flashing free of mortar droppings.
- B. Control Joints:
 - 1. Install in strict accordance with the manufacturer's published recommendations.
 - 2. Provide control joints at all inside corners and where new masonry abuts existing masonry.
 - 3. Lap horizontal joint reinforcing at all control joints.
 - 4. Locate vertical control joints at 16'-0" o.c. maximum for all masonry.
 - 5. Locate elsewhere where indicated on the Drawings.
- C. Ties and Anchors:
 - 1. Install in strict accordance with the manufacturer's published recommendations.
 - 2. Install ties into projecting eyes of truss or ladder type wall reinforcement, or into retainer area of supportive stud clip or anchor device.
 - 3. Position for proper placement in veneer wall.
- D. Rebar Positioners:
 - 1. Install in strict accordance with the manufacturer's published recommendations.
 - 2. Secure all vertical reinforcing bars in all masonry walls by use of positioners.
 - 3. Position re-bar in center of concrete block core.
 - 4. Rest bends of wire on shell of block to allow wire to span and bridge cell.
- E. Masonry Slip Joint:
 - 1. Install in strict accordance with the manufacturer's published recommendations.
 - 2. Place at horizontal mortar joint coursing located just below the steel relieving angle in both the veneer and the masonry back-up wall.
 - 3. Install with adhesive backing, bottom side only. Top side shall be free to "float" below course above.

SUBMITTAL CHECKLIST

- 1. Manufacturer's Literature.
- 2. Samples.

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to furnish and install all masonry reinforcement indicated, noted and detailed on the Drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 04150 - Masonry Accessories Section 04220 - Concrete Unit Masonry

1.03 <u>REFERENCES</u>

- A. Publications of the American Society for Testing and Materials, ASTM are referred to in this section.
- B. All work shall comply with ACI 530 and recommendations of The Masonry Society.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Arrange deliveries to provide sufficient quantities of reinforcement to permit continuity of masonry work.
- B. Store reinforcement on blocks or shores to prevent contact with the ground and keep covered to prevent damage from the weather.

1.05 <u>SUBMITTALS</u>

- A. Manufacturer's Literature:
 - 1. Manufacturer's data sheets, cutsheets and materials description.
 - 2. Test data for strength and integrity.
- B. Samples:
 - 1. Provide actual sample of unit as requested by the Architect.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, by one of the following acceptable manufacturers:
 - 1. Hohmann & Barnard (H&B).
 - 2. A-A Wire Products Company.
 - 3. Baltimore Birmingham.
 - 4. Wire-Bond
 - 5. Heckman Building Products, Inc.
 - 6. Masonry Reinforcing Corp. of America.
 - 7. National Wire Products Corp.

2.02 MATERIALS

- A. Materials shall conform to the following requirements:
 - 1. American Society for Testing and Materials (ASTM).
 - 2. "Cold-Drawn Steel Wire for Concrete Reinforcement", ASTM Designation A82.
 - 3. Mill galvanized wire in accordance with ASTM A641, Class 3 (0.80 oz./ft.2).
- B. Provide deformed bars of the size indicated on the drawings of the following grades:
 - 1. All reinforcing: ASTM A615, Grade 60.

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C. Provide all required metal accessories, including spacers, chairs, ties and other devices necessary for properly assembling, placing, spacing and supporting all reinforcement in place.

2.03 HORIZONTAL JOINT REINFORCEMENT

- A. Description:
 - 1. Hot dipped galvanized.
 - 2. Prefabricated from cold-drawn steel wire complying with ASTM A82.
 - 3. Welded wire units comprised of two No. 9 gauge deformed continuous longitudinal side rods and a continuous No. 9 gauge plain cross rods at 16" o.c. maximum, spanning between to form a truss design.
 - 4. Factory prefabricated Corners and Tees shall be used at all corners and intersecting walls and shall be of the same design, gauge, profile and finish as the continuous joint reinforcement.
- B. Size:
 - 1. Furnish in standard length sections, not less than 10'-0".
 - 2. Width to be 2 inches less than width of the wall.
- C. Provide one of the following approved products for single-wythe systems: 1. "H&B", #120, Lox-All Truss Mesh.
- D. Provide one of the following approved products for multi-wythe non-adjustable systems:
 1. "H&B", #130, Truss-Tri-Mesh.
- E. Provide one of the following approved products for multi-wythe adjustable systems:
 1. "H&B", #170, Truss Lox-All Adjustable Eye-Wire.

2.04 CAVITY WALL REINFORCEMENT

A. Description:

- 1. Brick and Block Veneer: Hot dipped galvanized. Stone Veneer: Stainless steel, type 304.
- 2. Prefabricated from cold-drawn steel wire complying with ASTM A82.
- 3. 2-piece design comprised of a continuous joint reinforcement member, of a truss or ladder design, and a veneer wall tie that interlock together via an integral eye wire hook and loop.
- 4. Factory prefabricated Corners and Tees shall be used at all corners and intersecting walls and shall be of the same design, gauge, profile and finish as the continuous joint reinforcement.
- B. Continuous Joint Reinforcement Member:
 - 1. Wire units comprised of two No. 9 gauge deformed continuous longitudinal side rods and a continuous No. 9 gauge plain cross rods at 16" o.c. maximum, spanning between to form a truss or ladder design.
 - 2. Integral projecting eyes factory welded to the continuous joint reinforcement. Length of projecting arms for eyes to be as required for thickness of wall cavity construction.
- C. Veneer Wall Ties:
 - 1. U-shaped ties with hooked open ends to interlock into eyes on continuous joint reinforcement member.
- D. Provide one of the following approved products:
 - 1. "H&B", Lox-All, Adjustable Eye Wire, Truss Type #170, with adjustable ties.
 - 2. "H&B", Lox-All, Adjustable Eye Wire, Ladder Type #270, with adjustable ties.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout.
- B. Position reinforcement accurately at the spacing shown. Support and secure vertical bars against displacement. Provide a clear distance between bars of not less than the nominal bar diameter or 1 inch, whichever is greater.
- C. Provide continuous horizontal joint reinforcement in all reinforced masonry walls at 16 inches o.c.
- D. For pilasters, provide a clear distance between vertical bars as shown, but not less than 1-1/2 times the nominal bar diameter or 1-1/2 inches, whichever is greater. Provide lateral ties as shown.
- E. A continuous bond beam with (2) #5 bars shall be provided at the top of all walls, and at all bearing elevations, unless otherwise indicated.
- F. At beams or lintels bearing on masonry walls, fill (2) block cores solid with grout and reinforce each core with one vertical #5 bar full height of wall, unless otherwise indicated.
- G. Place (1) full height vertical #5 bar at all wall corners, ends of walls, sides of openings and wall intersections, unless otherwise indicated. Place (2) vertical #5 bars at sides of openings 10'-0" wide and greater, unless otherwise indicated.

3.02 SPLICES

- A. Splice reinforcing bars where shown. Do not splice at other points unless approved by the Architect/Engineer.
- B. Splices shall be lapped, unless otherwise indicated.
- C. In splicing vertical bars or attaching to dowels, lap ends and place bars in contact and tie with wire.
- D. Splices in vertical reinforcement shall be lapped a minimum of 48 bar diameters, unless noted otherwise.

SUBMITTAL CHECKLIST

- 1. Manufacturer's Literature.
- 2. Samples.

SECTION 04210 - FACE BRICK MASONRY

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete brick masonry work.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 01210 - Cash Allowances Section 04100 - Mortar Section 04150 - Masonry Accessories Section 04160 - Masonry Reinforcement Section 04510 - Masonry Protection & Cleaning Section 07650 - Flexible Flashing

1.03 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Employ masons skilled and experienced in the setting of brick.
 - 2. Only first-class brickwork will be accepted.

B. Mock-Up Panel:

- 1. Construct on site sample panel 4 foot wide x 4 foot high, of typical wall thickness and construction.
- 2. Show proposed color range, texture, bond, mortar color, mortar joint and workmanship of masonry materials.
- 3. Do not proceed with masonry work until sample panel has been approved.
- 4. Use panel as standard of comparison for all masonry work.
- 5. Do not destroy or remove panel until all masonry work is complete and accepted.

1.04 SUBMITTALS

A. Samples:

 If specific brick has been specified: Masonry contractor to submit brick papels or 5-brick p

Masonry contractor to submit brick panels or 5-brick pallet samples for final approval by Architect. Color, texture and range of brick to be submitted as specified.

- If specific brick has not been specified: Masonry contractor to select and submit brick panels or 5-brick pallet samples for final selection by Architect. Color, texture and range of brick to be submitted to be per direction of the Architect.
- 3. Brick submitted shall conform to these specifications and be within color and texture range specified.
- 4. Selected brick samples shall have mock-up panels constructed for final selection and approval.
- 5. Lay additional sample panels as directed by Architect
- 6. Architect reserves the right to select any brick from any supplier.
- B. Test reports indicating compressive strength, water absorption, saturation and suction.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store brick off ground to prevent contamination by mud, dust or materials likely to cause staining or other defects.
- B. Cover materials as necessary to protect from elements.

PART 2 - PRODUCTS

2.01 FACE BRICK

A. Size:

- 1. Typical standard Modular units: 8 inches long x 2-1/4 inches high x not less than 3-5/8 inches deep.
- B. Special Shapes:
 - 1. Cut standard unit with power saw or provide units manufactured to sizes or shape required.
 - 2. Provide solid brick, watertable profile, finished ends, special sizes, etc. as required.
 - 3. Special shape items to match selected brick in every other respect.
- C. Conform to ASTM C 216, Grade SW, Type FBS.
- D. Brick submitted shall be from brick manufacturers who are able to provide certification and physical evidence that the brick has been successfully used in projects of similar exposure for at least three complete climatic cycles without physical or visual changes.
- E. Do not exceed variations in color and texture of accepted samples and mock-up.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Verify initial absorption rate of brick is within acceptable limits.
- B. Reduce initial absorption exceeding 20 g./30sq. in/min by thoroughly wetting with clean water 24 hours prior to placement.

3.02 INSTALLATION

A. General:

- 1. Lay brick plumb and true to lines.
- 2. Cut exposed brick with masonry saw.
- 3. Anchor brick veneer to backing with metal reinforcement.
- 4. Where fresh masonry joins partially set masonry.
 - a. Remove loose brick and mortar.
 - b. Clean and lightly wet exposed surface of set masonry.
- 5. Stop off horizontal run of masonry by racking back 1/2 length of unit in each course.
- 6. Toothing is not permitted except upon written acceptance of the Architect.
- B. Weep Holes:
 - 1. See Section 04150 Masonry Accessories.
 - 2. Keep weep holes and area above flashing free of mortar droppings.
- C. Sealant Recesses:
 - 1. Retain joints around outside perimeters of exterior doors, windows frames and other wall openings.
 - 2. Depth: Uniform 3/4 inch.
 - 3. Width: 3/8 inch.
- D. Movement Joints:
 - 1. Keep clean from all mortar and debris.
 - 2. Locate as shown on drawings.

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- E. Sealant:
 - 1. See Section 07900-Joint Sealers for all labor and material for sealing perimeter recesses and joints.

3.03 PROJECT CONDITIONS

- A. Staining: Prevent grout or mortar from staining the face of masonry to be left exposed or painted.
 - 1. Remove immediately grout or mortar in contact with face of masonry.
 - 2. Protect sills, ledges and projections from mortar droppings.
 - 3. Protect door jambs and corners from damages during construction.
- B. Cold Weather Protection:
 - 1. Preparation:
 - a. If ice or snow has formed on masonry bed, remove by carefully applying heat until top surface is dry to the touch.
 - b. Remove all masonry deemed frozen or damaged.
 - 2. Products:
 - a. When brick suction exceeds 20 g/30 sq. in./min., sprinkle with heated water.
 - 1) When units are above 32°F, heat water above 70°F.
 - 2) When units are below 32°F, heat water above 130°F.
 - b. Use dry masonry units.
 - c. Do not use wet or frozen units.

SUBMITTAL CHECK LIST

- 1. Brick Samples.
- 2. Test Reports.
- 3. Mock-up Panel.

SECTION 04211 - BRICK PAVERS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to complete brick paver work as shown on drawings and specified herein.
- B. Geotextile fabric for soil stabilization, soil separation, weed barrier, or moisture barrier is specified in Section 02200 Earthwork.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 02200 – Earthwork Section 03300 – Cast-In-Place Concrete

1.03 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Employ masons skilled and experienced in the setting of brick pavers.
 - 2. Only first-class brick paver work will be accepted.

B. Mock-Up Panel:

- 1. Construct on site sample panel 1'-4" wide x 1'-4" long.
- 2. Show proposed color range, texture, bond, mortar color, mortar joint, spacing, and workmanship of masonry materials.
- 3. Do not proceed with paver work until sample panel has been approved.
- 4. Use panel as standard of comparison for all paver work.
- 5. Do not destroy or remove panel until all paver work is complete and accepted.

1.04 <u>SUBMITTALS</u>

- A. Samples:
 - If specific brick has been specified: Masonry contractor to submit brick panels or 5-brick pallet samples for final approval by Architect. Color, texture, and range of brick to be submitted as specified.
 - If specific brick has not been specified: Masonry contractor to select and submit brick panels or 5-brick pallet samples for final selection by Architect. Color, texture, and range of brick to be submitted to be per direction of the Architect.
 - 3. Brick submitted shall conform to these specifications and be within color and texture range specified.
 - 4. Selected brick samples shall have mock-up panels constructed for final selection and approval.
 - 5. Lay additional sample panels as directed by Architect
 - 6. Architect reserves the right to select any brick from any supplier.
- B. Test reports indicating compressive strength, water absorption, resistance to freeze-thaw, and abrasion resistance.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Store brick off ground to prevent contamination by mud, dust, or materials likely to cause staining or other defects.
- B. Cover materials as necessary to protect from elements.
- C. Band with rust resistant bands.

PART 2 - PRODUCTS

2.01 BRICK PAVERS

A. Size:

- 1. To match standard Modular size units: nominal 4" x 8".
- 2. To march standard Utility size units: nominal 4" x 12".
- 3. 2-1/4" thick brick for pedestrian or light vehicular traffic applications.
- 4. 2-3/4" thick brick for heavy vehicular traffic applications.
- B. Pavers may be chamfered and lugged or square edge without lugs. Finish may be smooth or textured. All color and texture and finish selections shall be by Architect.
- C. Special Shapes:
 - 1. Cut standard unit with power saw or provide units manufactured to sizes or shape required.
 - 2. Special shape items to match selected brick in every other respect.
- D. Brick submitted shall be from brick manufacturers who are able to provide certification and physical evidence that the brick has been successfully used in projects of similar exposure for at least three complete climatic cycles without physical or visual changes.
- E. Do not exceed variations in color and texture of accepted samples and mock-up.
- F. Performance Criteria:
 - 1. Pedestrian or light vehicular traffic applications:
 - 2-1/4" thick brick minimum in accordance with ASTM C 902, Class SX, Type 1, Application PS.Heavy vehicular traffic applications:
 - 2-3/4" thick brick minimum in accordance with ASTM ASTM C 1272, Type R, Application PX.
 - 3. Slip resistance shall be tested in general accordance with ASTM C 1028-96, standard test method for determining the static coefficient of friction of ceramic tile and other like surfaces by the horizontal dynamometer pull-meter test. Minimum static coefficient of friction shall be .60 for wet and .70 for dry, for all applications.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify initial absorption rate of brick is within acceptable limits of manufacturer.

- B. Reduce initial absorption exceeding acceptable limits of manufacturer by thoroughly wetting with clean water 24 hours prior to placement as directed by the manufacturer.
- C. Prepare subgrade and base beneath paver section per detail on drawings and as required to properly set paver system atop.

3.02 INSTALLATION

- A. General:
 - 1. Lay brick plumb and true to lines.
 - 2. Cut brick as required for size and configuration with masonry saw.

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- B. Allowable Tolerances:
 - 1. Joint widths to be no greater than 5/32 of an inch and not less than 1/16 of an inch.
 - 2. Pavers shall not be directly touching each other unless they have spacing bars.
- C. Joint Treatment:
 - 1. Sweep dry sand into the joints after the pavers have been set in place until joints are flush with top surface.
 - 2. Fog lightly with water.
 - 3. Repeat process until joints are full.
- D. Leveling:
 - 1. Protect newly laid pavers with plywood or carpeting as the work progresses.
 - 2. If additional leveling is required, you must protect the surface to avoid chipping.

SUBMITTAL CHECK LIST

- 1. Brick Samples.
- 2. Test Reports.
- 3. Mock-up Panel.

SECTION 04220 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to provide and complete all concrete unit masonry work on this Project as indicated, noted, detailed and scheduled on the drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 04100 - Mortar Section 04150 - Masonry Accessories Section 04160 - Masonry Reinforcement Section 04510 - Masonry Protection and Cleaning Section 07650 - Flexible Flashing

1.03 QUALITY ASSURANCE

- A. Comply with the provisions of the latest editions of the following Codes, Specification and Standards, except as otherwise indicated on the Drawings or specified herein.
 - 1. The Masonry Society, Masonry Designer's Guide.
 - 2. ACI 530 Building Code Requirements for Masonry Structures.
 - 3. ACI 530.1 Specifications for Masonry Structure.
 - 4. NCMA "Specification for the Design and Construction of Load-Bearing Concrete Masonry".
 - 5. "American Standard Building Code Requirements for Masonry, A41.1-1953 (R1970)".
 - 6. American Society for Testing and Materials (ASTM).
- B. Concrete masonry units used throughout the work shall be obtained from one manufacturer.
- C. Reinforced hollow load-bearing CMU shall be Grade N-I moisture controlled units conforming to ASTM C90-85. Minimum Compressive Strength required for units shall be 2,000 psi on the NET AREA of the units and 1,000 psi on the GROSS AREA. Normal weight or light weight units.
- D. Provide special shapes where required, for lintels, bond beams, pilasters, headers and other special conditions.

1.04 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's catalog data, cutsheets, literature, specifications and installation instructions.
 - 2. Test data for unit strength.
- B. Color Samples:
 - 1. If color is indicated, submit actual sample of finish selected for final review and approval.
 - 2. If not indicated, color to be selected by Architect from manufacturer's entire selection.
 - 3. Submit actual samples for review and approval if requested.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS (CMU)

- A. Size:
 - 1. Standard-sized units shall be used, unless otherwise noted.
 - 2. Nominal face dimensions of 16 inches long x 8 inches high.
 - 3. Thickness of units shall be as indicated on drawings.
 - 4. See drawings for additional requirements or clarifications for type, face, texture, finish, color, etc.

B. Properties:

- 1. Below Grade: Standard/Normal weight units with sand, gravel, crushed stone, aggregate.
- 2. Above Grade: Light weight units with expanded aggregate.
- 3. Shall comply with the requirements of ASTM C90.
- C. Water Repellent:
 - 1. Provide one of the following approved products:
 - a. "Grace Construction Products"; Dry-Block.
 - b. "BASF"; Rheopel Plus.
 - c. "ACM"; RainBloc.
 - d. "Krete"; HQ.
 - 2. Use for all exterior walls whose concrete masonry face is exposed to the exterior. Not required for masonry backup in veneer walls (brick, stone, etc.).
- D. Reinforced Load-Bearing CMU and CMU Shear Walls:
 - 1. Grade N-1 moisture controlled units.
 - 2. Minimum compressive strength of 2,000 psi on the NET AREA of the units. Minimum compressive strength of 1,000 psi on the GROSS AREA of the units. Standard/Normal weight or Light weight units.
 - 3. Shall comply with the requirements of ASTM C90-85.
 - 4. Net compressive strength: f'm = 1,500 p.s.i minimum (Prism or Unit Strength Method).
- E. Color:
 - 1. Standard natural, non-colored concrete masonry unit.
- F. Provide one of the following approved products:
 - 1. "4D/Schuster's (Oldcastle)"; Custom Architectural Masonry Units.
 - 2. "General Shale"; Custom Architectural Masonry Units.
 - 3. "L. Thorn Brick and Block"; Custom Architectural Masonry Units.
 - 4. "Masolite"; Concrete Masonry Units.

2.02 SPECIAL UNITS

- A. Provide special shapes where required throughout the work for lintels, bond beams, bullnoses, pilasters, headers and other special conditions.
- B. Same material, surface, texture, aggregate, grade and color of adjacent concrete masonry units.
- C. Brick units for bearing, leveling and filling.
- D. Bullnose units with 1 inch radius corner.
- E. U-block and bond beam units.
- F. Center-scored units with 3/8 inch vertical groove to form an 8 inch x 8 inch face pattern. Scoring pattern may be required to be on both faces of masonry unit.

2.03 <u>MORTAR</u>

A. See Specification Section 04100 - Mortar.

2.04 STEEL REINFORCEMENT

A. See Specification Section 04160 - Masonry Reinforcement.

2.05 <u>GROUT</u>

- A. Grout for reinforced masonry shall have a minimum compressive strength of 2,500 psi at 28 days and shall comply with requirements of ASTM C150.
- B. Portland Cement, Type 1, and shall comply with the requirements of ASTM C150.
- C. Fine aggregates for grout shall comply with the requirements of ASTM C404.
- D. Coarse aggregates for grout shall be pea gravel, 3/8" diameter maximum.
- E. Water shall be clean, fresh and potable.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Bond:
 - 1. Stack bond on all exposed walls, unless otherwise indicated.
 - 2. Running bond allowed where unexposed.
- B. Tooling:
 - 1. Smooth concave joints for all areas, except center scored block.
 - 2. Raked joint for center scored block.
- C. Placing:
 - 1. Set units plumb and true to line with level, accurately spaced and coordinated with other work.
 - 2. Lay CMU units with full-face shell mortar beds.
 - 3. Fill vertical head joints solidly with mortar from face of unit to a distance behind face equal to not less than the thickness of the longitudinal face shells.
 - 4. Solidly bed cross-webs of starting courses in mortar.
 - 5. Provide 3/8 inch joints unless otherwise shown.
- D. Bond Beams:
 - 1. Use special units or modify regular units to allow for placement of continuous horizontal reinforcing bars as indicated.
 - 2. Place wire screening or expanded metal lath in mortar joints under bond beam courses over non-reinforced vertical cores, or provide units with solid bottoms.
- E. Pilasters:
 - 1. Lay wall and pilaster units together to maximum pour height shown.
 - 2. Pilaster units shall provide minimum clearances and grout coverage for number and size of vertical reinforcement as indicated.
- F. Bullnose Units:
 - 1. Install at all exposed vertical corners, unless otherwise indicated.
 - 2. Install at all exposed horizontal edges, unless otherwise indicated.
- G. Square Edge Units:
 - 1. Use only where specifically noted as allowed in lieu of bullnose edges.
 - 2. All exposed square edge block units must be formed using a Universal Press Top (UPT) mold.
- H. Build masonry construction to the full thickness shown, except build single-wythe walls to the actual thickness of the masonry units, using unit of nominal thickness as indicated or specified.

CONCRETE UNIT MASONRY

- I. Cut masonry units with motor-driven saw designed to cut masonry, with clean, sharp, unchipped edges. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.
- J. Maintain vertical continuity of core or cell cavities which are to be reinforced or grouted, to provide minimum clearance and grout coverage for vertical reinforcing bars. Solidly bed webs in mortar where adjacent to reinforced cores.
- K. DO NOT WET concrete masonry units.
- L. Use no piece shorter than 8 inches.
- M. Bond all corners in each course.
- N. All masonry walls shall be laterally braced by the Contractor as required until all structural framing and decking have been installed in units of construction adjacent to the walls.
- O. As the work progresses, install all built-in items as specified under this or any other Section.

3.02 <u>GROUTING</u>

- A. Contractor may use either low-lift or high-lift grouting techniques, subject to the following requirements.
- B. All masonry units located below grade shall be grouted solid, whether indicated or not.
- C. Low Lift Grouting:
 - 1. Vertical cells to be filled shall have vertical alignment sufficient to maintain a clear, unobstructed continuous vertical fall measuring not less than 2 inches by 3 inches.
 - 2. Units must be laid to a height not to exceed 8 feet. If height exceeds 4 feet, cleanouts must be used. Stop pour at course below bond beams.
 - 3. Place vertical steel into cells with enough steel extending to provide lap splice of 48 bar diameters or as indicated on drawings.
 - 4. In grouting vertical cells, stop grout 1-1/2 inches below top of unit or over horizontal steel which shall be fully embedded in grout.
 - 5. Place grout continuously, using a chute or container with spout. Rod or vibrate grout during placing. Do not interrupt placing of grout for more than 1 hour.
 - 6. Place horizontal bond beam reinforcement as the masonry units are laid. Lap at corners and intersections. Place grout in bond beams before filling vertical cores above bond beams.
 - 7. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Reinforce or brace cleanouts to resist grout pressure.
 - 8. Prior to grouting, inspect and clean grout spaces. Clean top surfaces of all structural members supporting masonry to ensure bond.
- D. High-Lift Grouting:
 - 1. All paragraphs and items for Low-Lift Grouting above apply to this section, with the exception of the limitation of height that units must be laid to.
 - 2. Limit grout pours to sections which can be completed in one working day with not more than one hour interruption of pouring operation. Place grout in lifts which do not exceed 4 feet. Allow not less than 30 minutes nor more than one hour between lifts of a given pour. Rod or vibrate each grout lift during pouring operation.
 - 3. Place grout by pumping into grout spaces. Alternate placing methods shall be approved by the Architect/Engineer.

- 4. Vertical reinforcement shall be held in position at top and bottom and at intervals not exceeding 6 feet.
- 5. Minimum cell dimension shall be 3 inches for high-lift grouting.

3.03 FORMWORK AND SHORES

- A. Provide temporary formwork and shores as required for temporary support of reinforced masonry elements. Design, erect, support, brace and maintain formwork properly.
- B. Construct formwork to conform to shape, line and dimensions as shown.
- C. Forms and/or shores shall not be removed until reinforced masonry member has hardened sufficiently to carry its own weight and all other loads that may be placed on it during construction.
- D. Provide bracing adequate to resist wind loads, bracing shall remain in place until metal roof deck installation and attachment to masonry walls is completed.

3.04 REPAIR, POINTING AND CLEANING

- A. By brushing, stoning, rubbing, detergent and water, or other approved method.
- B. Remove and replace masonry units that are loose, chipped, broken or otherwise damaged. Provide new units to match adjoining and adjacent units, and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- C. During the tooling of joints, enlarge any voids or holes and completely fill with mortar. Point-up all joints to provide a neat, uniform appearance.
- D. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings. Comply with recommendations in NCMA TEK Bulletin No. 28.

SUBMITTAL CHECKLIST

- 1. Product Data.
- 2. Color Samples.

SECTION 04420 - CUT STONE

PART 1 - GENERAL

1.01 WORK INCLUDED

Furnish labor, materials, equipment, special tools, supervision and services required to furnish and install all cut stone indicated, noted and detailed on the drawings and specified herein.

1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 03300 - Cast-in-Place Concrete Section 04100 - Mortar Section 04510 - Masonry Cleaning and Protection Section 07900 - Joint Sealers

1.03 QUALITY ASSURANCE

A. Comply with Industry Standards and Practices as set forth by the Indiana Limestone Institute of America, Inc.

1.04 <u>REFERENCES</u>

- A. Publications of the following institutes, associations, societies, and agencies are referred to is this Section.
 - 1. American Society for Testing and Materials, ASTM.
 - 2. Indiana Limestone Institute of America, Inc. ILI.
- B. Fabricator shall be an established firm regularly engaged in the fabrication of limestone. Fabricator shall have adequate equipment and qualified personnel to fabricate quality stone products and have past experience in the fabrication of limestone for projects of a similar nature.
- C. Quarrier and fabricator of the stone for this Project shall be a member in good standing of the Indiana Limestone Institute of America, Inc.

1.06 SUBMITTALS

- A. Furnish for approval by the Architect, complete cutting and setting drawings for all cut stone work.
 - 1. Show in detail the sizes, sections and dimensions of stone, the arrangement of joints and bonding, anchoring and other necessary details.
 - 2. Strictly follow all jointing shown by the Architect on contract drawings, unless modifications are agreed upon in writing or indicated upon the approved Shop Drawings.
 - 3. If the contract drawings do not show the intent of the jointing, it will be the fabricator's responsibility to establish the jointing in accordance with industry standards and practices.
 - 4. The general contractor shall furnish all field dimensions necessary for fabrication.
 - 5. Mark each stone on an unexposed surface and indicate its location with a corresponding mark on the settings drawings.
 - 6. Clearly indicate on the cutting and setting drawings, all provisions for the anchoring, doweling, and cramping of work, in keeping with standard practices, and for the support of stone by shelf angles and loose steel, etc., when required.
- B. Furnish for approval by the Architect, two 12" x 12" samples of the limestone proposed for use in this project. Illustrate color range, texture and finish.

2.01 <u>MATERIALS</u>

- A. Materials shall conform to the following requirements:
 - 1. "Stainless and heat resisting chromium-nickel steel plate, sheet, and strip", ASTM designation A167.
 - 2. "Dimension Limestone", ASTM designation C568.
- B. Fabricate dowels, anchors, cramps, dovetails and slots from Type 18-8, 302 stainless steel conforming to ASTM designation A167.
- C. Cut stone shall be Indiana Limestone quarried in Lawrence, Monroe or Owen Counties, Indiana.
 - 1. Grade: Standard.
 - 2. Color: Natural Gray.
 - 3. Conform to ASTM designation C568 for category II medium density stone with 4,000 psi compressive strength.

2.02 FABRICATION

- A. Cut stone accurately to shade and dimension, full to the square, with jointing as shown on the drawings.
 - 1. Dress all exposed faces and unless otherwise indicated, beds and joints shall be right angles to the face. Saw or dress backs parallel to face.
 - 2. Joints unless otherwise indicated shall have a uniform thickness of 3/8 inch.
 - 3. Cut reglets and drips where indicated on the drawings.
 - 4. Cut drips under all window and door heads, window sills, water tables, and other projecting courses.
 - 5. Provide holes and sinkages for anchors and back-check structural work.
 - 6. Provide lewis holes in stones weighing over 100 pounds and over 3-1/2 inch thick.

2.03 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack all cut limestone for transportation, exercising all customary and reasonable precautions against damage in transit.
- B. Load and ship stone in sequence with erection and in quantities sufficient with construction phase.
- C. Store all stone clear of ground on non-staining skids (cypress, white pine, poplar or yellow pine without excessive amount of resin). DO NOT use preservatives treated wood, chestnut, walnut, fir, oak or other woods containing tannin.
- D. Cover stone with waterproof paper or polyethylene.

PART 3 - EXECUTION

- 3.01 SETTING
 - A. Set all limestone accurately in strict accordance with the contract and shop drawings.
 - B. When necessary, before setting in the wall, thoroughly clean all exposed stone surfaces by washing with fiber brush and soap powder, followed by a thorough drenching with clear water.
 - C. Drench all stone joint surfaces not thoroughly wet with clear water just prior to setting.
 - D. Except as otherwise specially noted, set every stone in full beds of mortar with all vertical joints slushed full. Completely fill all anchor, dowel, and similar holes. All bed and vertical joints shall be 3/8" unless otherwise noted.

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- E. Place lead or plastic setting pads under heavy stones, column drums, etc., in same thickness as joint, and in sufficient quantity to avoid squeezing mortar out. Do not set heavy stones or projecting courses until mortar in courses below has hardened sufficiently to avoid squeezing.
- F. Joints can be tooled when initial set has occurred, or raked out 1" and pointed later. If pointed with sealant, conform to manufacturer=s instructions regarding raked depth and sealant applications.
- G. Securely prop or anchor projecting stones until the wall above is set.
- H. Embed in mortar only the ends of lugged sills and steps. Leave balance of joint open until finally pointed.
- I. All cornice, copings, projecting belt courses, other projecting courses, steps, and platforms (in general, all stone areas either partially or totally horizontal) should be set with unfilled vertical joints. After setting, point or install sealant.
- J. In cold weather, follow International Masonry Industry All-Weather Council recommendations for setting from 40° to 20°F, except that no additives are to be used in the setting mortar. Heated enclosures are to be used for work done below 20°F.

3.02 <u>CLEANING</u>

- A. Wash the stone with fiber brushes, mild soap powder or detergent and clean water or approved mechanical cleaning process.
- B. Provide special consideration and protection when brickwork is cleaned above the limestone. Strong acid compounds used for cleaning brick will burn and discolor the limestone.
- C. Use of sand blasting, wire brushes or acids will only be permitted under special circumstances, approved by Architect.

3.03 PROTECTION OF FINISHED WORK

- A. During construction, carefully cover tops of walls at night, and especially during any precipitation or other inclement weather.
- B. Adequately protect walls from dropping at all times.
- C. Whenever necessary, place substantial wooden covering to protect the stone work. Use nonstaining building paper or membrane under the wood. Maintain all covering until removed to permit final clearing of the stone work.

3.04 <u>CLEANING UP</u>

A. Upon completion, remove all materials, equipment and debris from the premises.

SUBMITTAL CHECK LIST

- 1. Cutting and Setting Shop Drawings.
- 2. Samples.

SECTION 04510 - MASONRY PROTECTION AND CLEANING

PART 1 - GENERAL

1.01 WORK INCLUDED

Furnish labor, materials, equipment, special tools, supervision and services required to protect masonry materials and masonry work and to complete the cleaning of masonry work.

1.02 RELATED WORK

Section 04100 - Mortar Section 04210 - Face Brick Masonry Section 04220 - Concrete Unit Masonry Section 04420 – Cut Stone

1.03 DELIVERY, STORAGE AND HANDLING

- A. Store masonry and mortar materials in a high, dry location and in such a manner as to prevent absorption of moisture from the ground.
 - 1. Cover materials completely with waterproof covering securely tied or weighted in place.
 - 2. Store accessory items to prevent damage from construction operations and elements.

1.04 <u>SUBMITTALS</u>

- A. Manufacturer's Literature:
 - 1. Manufacturer's data sheets, cutsheets and materials description.

PART 2 - PRODUCTS

2.01 CLEANING COMPOUND

A. Provide one of the following approved products (as applicable to specific project conditions):

- 1. Brick, Concrete Block, Tile:
 - a. "ProSoCo", Sure Klean #600.
 - b. "ProSoCo", Sure Klean #101 Lime Solvent (Red and Dark Colored Brick and Surfaces).
 - c. "ProSoCo", Sure Klean #800 Stain Remover (Buff or White Brick).
 - d. "ProSoCo", Enviro Klean Safety Klean.
 - e. "Sonneborn", Sonokleen 88.
 - f. "EaCo Chem", NMD 80.
- 2. Pre-Cast Concrete, Poured-In-Place Concrete:
 - a. "ProSoCo", Sure Klean #600.
 - b. "ProSoCo", Sure Klean Light Duty Concrete Cleaner.
 - c. "ProSoCo", Sure Klean Heavy Duty Concrete Cleaner.
 - d. "ProSoCo", Enviro Klean Safety Klean.
 - e. "EaCo Chem", NMD 80.
- 3. Limestone, Natural Stone, Non-Cementitious Manufactured or Synthetic Stones:
 - a. "ProSoCo", Sure Klean #800 Stain Remover.
 - b. "EaCo Chem", NMD 80 (not permitted for polished stone).
- 4. Cementitious Manufactured or Synthetic Stones:
 - a. "ProSoCo", Sure Klean Manufactured Stone Cleaner.
 - b. "EaCo Chem", NMD 80 (not permitted for polished stone).

2.02 MATERIALS

A. Use cleaning product especially formulated for cleaning the particular masonry materials involved.

1. Use only non-staining and non-corrosive products.

PART 3 - EXECUTION

3.01 PROTECTION

- A. When masonry work has been stopped for the day, courses shall be leveled and all joints, other than required cavities, shall be well filled with mortar.
- B. Protect masonry in place from rain with waterproof coverings securely fastened in place, until roof coverings, copings, flashing, or other permanent protection of the top of walls is in place.
- C. Protect all masonry protections from damage by use of wood covers or protective barricades.

3.02 COLD-WEATHER PROTECTION

- A. When ambient temperature is below 40°F the temperature of the masonry when laid shall not be less than 40°F.
 - 1. Thaw frozen sand before use. Do not scorch.
 - 2. The temperature of the mixed mortar to be at least 70°F but not more than 120°F.
 - 3. Do not exceed a mixing water temperature of 160°F.
 - 4. Do not use admixtures or anti-freeze compounds for the purpose of reducing the freezing temperature of mortar.
- B. When the ambient temperature is below 20°F, heat masonry units to 40°F. Maintain a temperature of at least 40°F on both sides of the wall for not less than 48 hours.

3.03 HOT WEATHER PROTECTION

- A. In hot dry weather, wet the mortar board and cover mortar to retard the drying out of the mortar.
- B. When the ambient temperature is above 80°F, mortar which dries too rapidly may be retempered with the addition of small quantities of water. Discard mortar if more than 2 hours after mixing.

3.04 <u>CLEANING</u>

- A. After all masonry work is completed, repair and point all defective work to the Architect's approval.
 - 1. Clean all exposed new work with masonry cleaning products used in accordance with the manufacturer's printed instructions.
 - 2. Protect all sash and other corrodible materials.

SUBMITTAL CHECK LIST

1. Manufacturer's Literature.

SECTION 04730 - SYNTHETIC STONE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to furnish and install all Synthetic Stone indicated, noted and detailed on the drawings and specified herein.
- B. The term "stone" as used in this specification section refers to the synthetic stone as specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 04100 - Mortar Section 04510 - Masonry Cleaning and Protection Section 07650 - Flexible Flashing

1.03 QUALITY ASSURANCE

- A. Comply with Industry Standards and Practices.
- B. Installer shall be an established firm regularly engaged in the laying of Synthetic Stone. Installer shall have adequate equipment and qualified personnel and have past experience in the laying of like stone products for projects of a similar nature.
- C. Lay stone in pattern consistent with approved mock-up panel.

D. Properties:

- 1. Compressive strength (ASTM C170): Min. 7,000 psi.
- 2. Modulus of Rupture (ASTM C99): Min. 600 psi.
- 3. Absorption (ASTM C97): Max. 9.4%
- 4. Density (ASTM C97): Min. 110 lb./ft.³
- 5. Nominal thickness: 3-1/2 inches, or as indicated on drawings.

1.04 MOCK-UP PANEL

- A. Install 8 feet long x 4 feet high mock-up panel on site using selected stone. Mock-up panel to be laid with mortar selected and shall indicate, size, texture, color, and pattern of stone, and shall remain on site as a quality reference until all stone work is complete.
- B. Mock-up panel will be reviewed and approved by Architect. Re-work mock-up panel as required to obtain approval. Do not proceed with work until mock-up panel has been approved.
- C. Install mock-up panel in a location so as not to require removal until all stone work is complete.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Carefully pack all stone for transportation, exercising all customary and reasonable precautions against damage in transit.
- B. Load and ship stone in sequence with erection and in quantities sufficient with construction place.
- C. Store all stone clear of ground on non-staining skids (cypress, white pine, poplar or yellow pine without excessive amount of resin). DO NOT use preservative treated wood, chestnut, walnut, fir, oak, or other woods containing tannin.
- D. Cover stone with waterproof paper or polyethylene.

1.06 <u>SUBMITTALS</u>

- A. Furnish for approval by the Architect, complete cutting and setting drawings for all cut stone work.
 - 1. Show in detail the sizes, section and dimensions of stone, the arrangement of joints and bonding, anchoring and other necessary details.
 - 2. Strictly follow all jointing shown by the Architect on contract drawings, unless modifications are agreed upon in writing or indicated upon the approved Shop Drawings.
 - 3. If the contract drawings do not show the intent of the jointing, it will be the fabricator's responsibility to establish the jointing in accordance with industry standards and practices.
 - 4. The general contractor shall furnish all field dimensions necessary for fabrication.
 - 5. Mark each stone on an unexposed surface and indicate its location with a corresponding mark on the settings drawings.
 - 6. Clearly indicate on the cutting an setting drawings, all provisions for the anchoring, doweling, and cramping of work, in keeping with standard practices, and for the support of stone by shelf angles and loose steel, etc., when required.
- B. Furnish for approval by the Architect, four 12 inch x 12 inch samples of the stone proposed for use in this project. Illustrate color range, texture and finish.

PART 2 - PRODUCTS

2.01 SYNTHETIC STONE - DIMENSIONED AND CUT

- A. Provide products, as approved by the Architect, from one of the following manufacturers:
 - 1. "Arriscraft International".
 - 2. "Custom Cast Stone".
- B. Synthetic stone masonry units finished with uniform face dimensions with straight sides as follows:
 - 1. Water Tables and Copings:
 - a. Custom fabricated to the shapes and dimensions shown on the drawings.
 - b. All water tables and copings to have drip edges.
 - c. All exposed surfaces mechanically dressed.
 - 2. Bands, Accents and Trim:
 - a. Finished with one major face dimension with six straight sides in the form of rectangular slabs with opposite sides parallel and adjacent sides at right angles.
 - b. Fabricated or field cut to the sizes shown on the drawings.
 - c. Smooth face, unless otherwise indicated.
- D. Units may be uniform or random length, provided the shortest length is not less than 18 inches.
- E. Final color, texture and pattern as approved in mock-up panel.
- F. Colors to match natural limestone shall approximate the color of Indiana Oolitic limestone buff.

2.03 ACCESSORIES

- A. Ties and dowels: Type 302 stainless steel, ASTM A167.
- B. Mortar: 1:1:6 portland cement, line, sand mix, color as selected.
- C. Flashing: See Section 07650 Flexible Flashing.

PART 3 - EXECUTION

3.01 <u>SETTING</u>

- A. Set all stone in accordance with approved mock-up panel. Follow manufacturers recommendations for installation.
- B. Set every stone in full beds of mortar with all vertical joints slushed full.
 For synthetic creekstone, all bed and vertical joints shall be minimum 3/8" and maximum 1-1/2".
 For synthetic dimension stone, all joints to be 3/8".
- C. Anchor stone with stainless steel wall ties spaced not over 18" horizontally and 24" vertically or use truss type reinforcing with adjustable tabs. Provide extra ties at large stones and at corners.
- D. In cold weather, follow International Masonry Industry All-Weather Council recommendations for setting from 40° to 20° F, except that no additives are to be used in the setting mortar. Heated enclosures are to be used for work done below 20° F.

3.02 <u>CLEANING</u>

- A. Wash the stone with fiber brushes, mild soap powder or detergent and clean water or approved mechanical cleaning process. Do not use acid under any circumstances. Cover stone during cleaning of other masonry work. Stone with stains will be rejected.
- B. Provide special consideration and protection when brickwork is cleaned above the stone. Strong acid compounds used for cleaning brick will burn and discolor the stone, and will be cause for rejection.
- C. Use of sand blasting, wire brushes or acids will not be permitted.

3.03 PROTECTION OF FINISHED WORK

- A. During construction, carefully cover tops of walls at night, and especially during any precipitation or other inclement weather.
- B. Adequately protect walls from dropping at all times.
- C. Whenever necessary, place substantial wooden covering to protect the stone work. Use nonstaining building paper or membrane under the wood. Maintain all covering until removed to permit final cleaning of the stone work.

3.04 WATER REPELLENT

A. Apply water repellent in strict accordance with manufacturer's recommendations quantities and yields.

3.05 CLEANING UP

A. Upon completion, remove all materials, equipment and debris from the premises.

SECTION 05100 - STRUCTURAL STEEL

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to fabricate, deliver and erect all structural steel indicated, noted and detailed on the drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 03300 - Cast-In-Place Concrete Section 05500 - Miscellaneous Metals

1.03 QUALITY ASSURANCE

A. All shop and field welders must hold a current and valid certificate issued by the American Welding Society. Certificates shall be carried and presented upon request of Architect/Engineer.

1.04 <u>REFERENCE</u>

- A. Publications of the following institutes, associations, societies and agencies are referred to in this Section.
 - 1. American Society for Testing & Materials, ASTM.
 - 2. American Institute of Steel Construction, AISC.
 - 3. Steel Structures Painting Council, SSPC.
 - 4. American Welding Society, AWS.
- B. Comply with the applicable portions of the following publications.
 - 1. "Manual of Steel Construction", AISC.
 - 2. "Specifications for Design, Fabrication, and Erection of Structural Steel for Buildings", AISC.
 - 3. "Structural Steel Detailing", AISC.
 - 4. "Specifications for A-36 and A-50 Steel Arc Welding Electrodes", AWS.
 - 5. "Code for Arc Welding in Building Construction", AWS.
 - 6. "Steel Structures Painting Manual", SSPC Vol. 2.
 - 7. "Riveted and Bolted Structural Joints", AISC.
 - 8. "Specifications for Structural Joints Using ASTM A325 and A490 Bolts", AISC.
- C. All structural steel and accessories shall be domestic products. Imported products will not be approved or used.

1.05 SUBMITTALS

- A. Furnish to the Architect/Engineer for his approval complete shop and field erection drawings.
 - 1. Submit drawings prior to fabrication and erection of structural steel.
 - 2. Base drawings on AISC Publication "Structural Steel Detailing".
 - 3. All connections not sized on drawings to be designed by licensed professional engineer, and certified designs to be indicated on shop drawings.
 - 4. Include complete details and schedules for the fabrication of each member.
 - 5. Include complete details, schedules, procedures and diagrams showing sequence of erection.
 - 6. Each member shown on the shop drawings shall be marked in such a manner that the member designations on the drawings coincide with the member designations on the member in the field.
 - 7. Complete anchor bolt setting plan for use in setting anchor bolts and leveling plates.
- B. Furnish the Architect/Engineer with the following certificates.
 - 1. AWS Certification of all welders who will perform work on this project.
 - 2. Certification form supplier that structural steel furnished for this project conforms to this specification.

STRUCTURAL STEEL

1.06 DELIVERY, STORAGE AND HANDLING

- A. Arrange deliveries in quantities to permit continuity of installation.
- B. Store on blocks off ground and cover to prevent rusting, denting and damage to materials or structure.

PART 2 - PRODUCTS

- 2.01 MATERIALS
 - A. Structural Steel:
 - 1. ASTM Specification A36 (36 KSI) except as follows:
 - a. Tubular Steel:
 - 1. ASTM Specification A500 Grade B (46 KSI) (Cold Formed)
 - or A501 (Hot Formed)
 - b. Steel Pipe:
 - 1. ASTM Specification A500 Grade B, (42 KSI).
 - c. Wide Flange Shapes:
 - 1. ASTM Specification A992 (50 KSI).
 - B. Paint For Shop Application:
 - 1. Prime with Type 1, oil alkyd, red oxide to minimum 2 mil dry thickness.
 - C. High-Strength Bolts, Including Nuts and Washers:
 - 1. ASTM Specification A325.
 - 2. Heavy hexagon structural bolts, heavy hexagon nuts and washers as required, unless otherwise indicated.
 - 3. Washers for high strength bolts shall be flat circular hardened steel washers conforming to ASTM F436.
 - D. Welded Headed Studs Used As Concrete Anchors:
 - 1. Shall be 1/2" diameter x 4" A.W.L., unless otherwise noted.
 - 2. Low carbon steel solid fluxed studs complying with ASTM A-108 with a minimum Fu = 60 KSI.
 - 3. Shall be automatically end welded.
 - E. Bolts and Nuts, Other Than High-Strength:
 - 1. ASTM Specification A307, Grade A.
 - F. Plain Washers, Other Than Those In Contact With High-Strength Bolt Heads and Nuts):
 - 1. ASNI Standard B18.22.1, Type B.
 - G. Anchor Bolts:
 - 1. Comply with ASTM F1554 Grade 36.
 - 2. Non-headed type with heavy hexagon structural nuts and washers as required, unless otherwise indicated.
 - H. Electrodes for Welding:
 - 1. Comply with AWS Code, using ASTM A233 E-70 series covered mild steel electrodes.
 - I. Non-Shrink Grout:
 - 1. Design is based on use of "Embeco" high-strength non-shrink grout manufactured by Master Builders.
 - 2. Non-Shrink grout shall be that upon which design is based or an equal approved by the Architect.

J. Remove all rolling and mill identification marks on all exposed members.

2.02 FABRICATION

- A. Rolled steel to shapes indicated with straight lines, sharp angles and smooth curves. Finished members to be true to line and free from twists, bends and open joints. Properly mark and match-mark all materials for field assembly.
- B. Fitting:
 - 1. Bearing surfaces: Planed to true beds.
 - 2. Abutting surfaces: Closely fitted.
- C. Use standard AISC framed connections using ASTM A325 bolts for attaching beams to columns except as otherwise shown. Develop design capacity of beam if not otherwise specified.\
- D. Holes for turned bolts: 1/6 in. larger than external diameter of bolt.
- E. Weld all shop connections except where otherwise shown or specified. Grind smooth all welds exposed in finished areas.
- 2.03 SHOP PAINTING
 - A. Clean structural steel of rust, scale, oil, grease or other foreign matter in accordance with SSPC Specifications SP3.
 - B. After cleaning apply one shop coat of primer.
 - 1. Apply shop coat of Type 1, oil alkyd, red oxide to minimum 2 mil dry film thickness
 - 2. Field touch-up all damaged paint areas using primer paint furnished by the fabricator. Touch-up includes bolts.
 - C. All exterior structural steel exposed to weather shall be hot dipped galvanized.
 - 1. Hot dip galvanize per ASTM A123, minimum 2.0 ounces per square foot.
 - 2. Touch-up primer: SSPC 20, Type III inorganic zinc rich, 95% weight of dry film.

2.04 COOPERATION

- A. Provide holes and connections required for other branches of the work where indicated. Secure from other trades associated on the project all necessary drawings and/or templates showing exact location and details required.
- B. Coordinate elevations with joint supplier.

PART 3 - EXECUTION

3.01 FIELD MEASUREMENT & COORDINATION

- A. The contractor is responsible for obtaining all necessary field measurements at the job site and will be held responsible for their accuracy and for the accurate fitting of this work with the work of others.
- B. Coordinate the installation of all holes, slots, anchoring assemblies and other necessary devices required by other sections of this specification. Do not install or attach such material which is acknowledge by AISC, ASTM, SSPC, AWS or manufacturer=s literature to be detrimental to the strength and durability of the structural steel. Do not make any such installations without prior review by the Architect/Engineer. Cutting, burning, drilling or punching of the steel in the field will not be permitted unless approved by the Architect/Engineer.

3.02 <u>ERECTION</u>

- A. Accurately set structural steel in accordance with approve shop and erection drawings to the lines and elevations indicated or noted with a maximum tolerance of 0.002 foot for 1/500.
- B. Grout under base plates and at other connections as shown on the Contract Drawings using non-shrink grout as specified herein. Grout under column base plates and secure hold down nuts before any other members are connected to columns.
- C. Install anchor bolts and other connectors required for securing structural steel to foundations and other in-place work.

3.03 <u>CONNECTIONS</u>

- A. Bolts in connections <u>not</u> within the slip-critical category shall be tightened to the snug tight condition, as defined in paragraph 8 (c) of the "Specification for Structural Joints Using ASTM A325 or A490 bolts".
- B. Bolts in connections within the slip-critical category shall be tightened using the turn-of-nut method, as defined in paragraph 8 (d) (1) of the "Specification for Structural Joints Using ASTM A325 or A490 bolts".
- C. All shop connections for beams and minor parts shall be welded.
- D. All field connections for beams and minor parts shall be bolted, where possible. Short slotted holes in beam web shall be detailed for beam connections where possible.
- E. Details shown on the plans are to illustrate general methods of connection and do not necessarily include all pieces required to complete the work. Such pieces are to be furnished as specified and/or required to complete the work.
- F. Connections not shown on the drawings shall be designed by the steel supplier in accordance with the AISC "Manual of Steel Construction". Simple span connections for beams shall be designed for one-half the beam load capacity as given in the AISC "Uniform Load constants for Beams Laterally Supported" Tables.
- G. Length of connection angles or plates for beam-to-column connections shall be the largest standard length less than or equal to the "T" dimension of the beam. Standard lengths of connection angles are found in "A.I.S.C. Manual of Steel Construction, Framed Beam Connections, Table II".
- H. All connections not shown on the drawings shall be designed by a Structural Engineer registered in the state where the structural steel is to be erected, retained by the steel fabricator. All calculations and shop drawings shall be duly stamped by the Registered Structural Engineer and submitted for review by the Structural Engineer. Stamping of shop drawings shall be for the exclusive purpose of certifying that the connections are detailed as per the design performed by the Registered Structural Engineer. Failure to submit stamped shop drawings and stamped calculations shall be sufficient cause for rejection of shop drawings. The Contractor shall be liable for the dimension, fit, tolerances, fabrication and erection.
- I. Welds shall be made only by operators who are qualified as prescribed in the "Standard Qualifications Procedure" of the American Welding Society. The Contractor shall furnish the Engineer with documents establishing the qualifications of welders involved in the work.

- J. Holes for the connection of all structural steel work, including slotted holes, shall be punched or drilled in the shop. Any additional holes not shown on the shop drawings shall be approved by the Engineer and shall be drilled in the field.
- K. All welds shall be pre-qualified in accordance with AWS D1.1.
- L. After erection and inspection, welded and bolted connections and abraded areas shall be thoroughly cleaned and covered with "Shop Coat" paint applied by this contractor.

3.04 FLAME CUTTING

A. There shall be no flame cutting in the field without the approval of the Architect. If cutting is approved, cut members shall be finished in a manner and to an appearance acceptable to the Architect.

3.05 WELDING INSPECTION

- A. The Inspector(s) shall be an AWS Certified Welding Inspector (CWI) qualified and certified in accordance with the provisions of AWS QC1, Standard for Qualification and Certification of Welding Inspectors.
- B. The Inspector shall ascertain that all fabrication and erection by welding is performed in accordance with the requirements of the contract documents.
- C. The Inspector shall make certain that all welding procedures are pre-qualified.
- D. The Inspector shall inspect the welding equipment to be used for the work to make certain that it conforms to the requirements of AWS D1.1.
- E. The Inspector shall require re-qualification of any welder or welding operator who has for a period exceeding six months not used the process for which the welder or welding operator was qualified.
- F. The Inspector shall make certain that the size, length, and location of all welds conform to the detail drawings and that no unspecified welds have been added without approval.
- G. The Inspector shall make certain that only welding procedures are employed which meet the provisions of AWS D1.1.
- H. The Inspector shall make certain that electrodes are used only in the positions and with the type of welding current and polarity for which they are classified.
- I. The Inspector shall, at suitable intervals, observe joint preparation, assembly practice, the welding techniques, and performance of each welder, welding operator, and tacker to make certain that the applicable requirements of AWS D1.1 are met.
- J. Inspectors shall identify with a distinguishing mark or other recording methods all parts of joints that they have inspected and accepted.
- K. The Inspector shall keep a record of qualifications of all welders, welding operators, and tackers, and all procedure qualifications or other tests that are made and such other information as may be required.
- L. The contractor shall be responsible for visual inspection and necessary correction of all deficiencies in materials and workmanship in accordance with the requirements of AWS D1.1.

- M. The contractor shall comply with all requests of the Inspector(s) to correct deficiencies in materials and workmanship as provided in the contract documents.
- N. In the event that faulty welding or its removal for re-welding damages the base metal so that in the judgment of the Engineer its retention is not in accordance with the intent of the contract documents, the contractor shall remove and replace the damaged base metal.
- O. All structural welds shall be visually inspected and all complete penetration welds shall be ultrasonically tested by a qualified inspector. Joint fit-up of all complete penetration and partial penetration welds shall be inspected and approved by a qualified inspector prior to making the first pass.

SUBMITTAL CHECK LIST

- 1. Shop Drawings.
- 2. Material certification stating source of steel.
- 3. Certificates of Welders.

SECTION 05500 - MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Miscellaneous metals include items made from iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.
- B. Types of work in this section include, but are not limited to the following:
 - 1. Steel Pipe Railings and Brackets.
 - 2. Loose Steel Lintels.
 - 3. Miscellaneous Framing and Supports.
 - 4. Steel Concrete Inserts.
 - 5. Pipe Bollards.
 - Steel Pan Stairs. (SPECIAL NOTE: Provide aluminum handrails and guardrails for Stair "B". The remaining elements of the stairing system shall be steel.
 - 7. Interior Ladders (contractor's option to aluminum specified in section 07725).
 - 8. Ships Ladder

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 03300 - Cast-In-Place Concrete Section 04210 - Face Brick Masonry Section 05100 - Structural Steel Section 07725 - Roof Scuttle and Ladders

1.03 QUALITY ASSURANCE

A. Comply with the applicable requirements of the following manuals, specifications and codes:

- 1. "Specification for Design, Fabrication and Erection of Structural Steel for Buildings", AISC.
- 2. "Code for Arc and Gas Welding in Building Construction", AWS.
- 3. "Structural Steel Detailing", AISC.

1.04 <u>REFERENCES</u>

A. Publications of the following institutes, associations, societies and agencies are referred to in this Section.

- 1. American Society for Testing and Materials, ASTM.
- 2. National Association of Architectural Metals Manufacturers, NAAMM.
- 3. Steel Structures Painting Council, SSPC.
- 4. American Welding Society, AWS.
- 5. American Institute of Steel Construction, AISC.
- B. All Miscellaneous Metals and fabricated items shall be domestic manufacture. Imported metals and products will not be approved or used.

1.05 <u>SUBMITTALS</u>

A. Furnish to the Architect for approval, complete shop and field erection drawings.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Fabricate and deliver miscellaneous metal items in ample time to avoid delays in the progress of any trade working on the project.
- B. Store on blocks off ground and cover to prevent rusting, denting and damage to materials or structure.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials shall conform with the following requirements:
 - 1. "Structural Steel", ASTM Designation A36.
 - 2. "Low and Intermediate Tensile Strength Carbon Steel Plates of Structural Quality", ASTM Designation A283.
 - 3. "Cold-Rolled Carbon Sheets, Commercial Quality", ASTM Designation A36.
- B. Structural Steel: 36,000 psi yield point rolled to the size and shapes indicated on the drawings.
- C. Welding Electrodes: Series #70, Grade AWS-2.
- D. Primer Paint: Supplier's standard shop primer paint.

2.02 MISCELLANEOUS METAL ITEMS

- A. Miscellaneous Metal Items but are not necessarily limited to the following:
 - 1. Steel angles, shelf angles, receiving angles, lintels and miscellaneous supports requiring fabrication.
 - 2. All bolts, inserts, clip angles, struts and channel framing.
 - 3. Handrails shall be steel pipe with welded joints. All welds shall be ground smooth. Provide closure plates at ends of all rails. Return all ends to wall unless otherwise detailed.

2.03 WORKMANSHIP

- A. Workmanship required in the execution of the work shall be of the best quality and subject to the approval of the Architect.
- B. Form metal work to shape and size, with sharp lines and angles. Leave clean, true lines and surfaces when shearing or punching. Weld permanent connections where practical.
- C. Holes in structural steel framing for attaching miscellaneous metal items will be provided by the miscellaneous metal erector.

2.04 FABRICATION

- A. The Contractor is responsible for verifying all dimensions of work adjoining. Inspect such work before fabrication and/or installation of items specified. Obtain measurements of adjoining work so work will fit closely to spaces provided.
- B. Provide opening angles, lintels and miscellaneous supports shown, requiring fabricating in accordance with notes and details.
- C. The fabricator shall furnish all necessary templates and patterns required by other trades. Also furnish all items except otherwise specified, pertaining to work under other sections.

2.05 SHOP PAINTING

- A. Clean all ferrous metals of all rust, scale, oil, grease or other foreign matter in accordance with SSPC Specification SP2-63.
- B. After cleaning apply one coat Type 1, oil alkyd, red oxide to minimum 2 mil dry film thickness
- C. All exterior miscellaneous steel to be hot dipped galvanized.
 - 1. Hot dip galvanizing per ASTM A123, min. 2.0 ounces per square foot.

MISCELLANEOUS METALS

2. Touch up primer: SSPC 20, Type I inorganic zinc rich.

PART 3 - EXECUTION

3.01 FIELD MEASUREMENT

- A. The Contractor is responsible for obtaining all necessary field measurements at the job site and will be held responsible for their accuracy and for the accurate fitting of this work with the work of others.
- 3.02 <u>GENERAL</u>
 - A. Perform all cutting, fitting and drilling necessary to properly set the work herein specified and as required for proper installation of adjacent or engaging work of all trades.

3.03 ADJUST AND CLEAN

- A. Touch Up Painting:
 - 1. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.
 - 2. Apply to provide a minimum dry film thickness of 2.0 mils.

SUBMITTAL CHECK LIST

1. Shop and setting drawings.

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to complete all rough carpentry work indicated, noted and detailed on drawings and specified herein including:
 - 1. Framing, blocking and furring.
 - 2. Wood treatment.
 - 3. Fasteners in treated wood.
 - 4. Subflooring.
 - 5. Blocking as required for items such as casework, cabinets, toilet accessories, lockers, and any other items requiring wood blocking for support, bracing, mounting, and securing in place.
 - 6. Termite Shield For Wood Construction.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 06200 - Finish Carpentry Section 06400 - Architectural Woodwork Section 08211 - Flush Wood Doors Section 08710 - Finish Hardware Section 09251 - Gypsum Drywall - Wood Stud Construction Section 09900 - Painting

1.03 QUALITY ASSURANCE

A. Grading Rules:

- 1. Lumber grading rules and wood species shall conform with Voluntary Product Standard PS-20. Grading rules of the following associations shall also apply to materials produced under their supervision.
 - a. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
 - b. Southern Pine Inspection Bureau (SPIB).
 - c. West Coast Lumber Inspection Bureau (WCLIB).
 - d. Western Wood Product Association (WWPA).
- 2. Plywood shall conform to the following:
 - a. Softwood Plywood Product Standard PS-1.
 - b. Hardwood Plywood Product Standard PS-51.
- B. Grade Marks:
 - 1. Identify all lumber and plywood by official grade mark.
 - 2. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
 - a. S-Dry: Maximum 15 percent moisture content.
 - b. MC-5 or KD: Maximum 15 percent moisture content.
 - c. Dense.
 - 3. Softwood Plywood: Appropriate grade trademark of the American Plywood Association.
 - a. Type, grade, class and identification index.
 - b. Inspection and testing agency mark.
 - 4. Hardwood Plywood: Appropriate grade mark of qualified inspection, testing, or grading mark.
- C. Testing:
 - 1. ASTM E 84, maximum 25 Flame Spread rating.

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- D. Requirements of Regulatory Agencies:
 - 1. Fire Hazard Classification: Underwriter's Laboratories, Inc., for treated lumber and plywood.
 - 2. Preservative Treated Lumber and Plywood: American Wood Preservers Bureau, Quality Mark.
 - 3. Pressure Treated Material: American Wood Preserves Bureau Standards.
 - 4. Span Tables: National Forest Products Association.
 - 5. Working Stresses: Softwood Lumber, National Design Specification, National Forest products Association.

1.04 <u>SUBMITTALS</u>

- A. Submit the following:
 - 1. Treating Plant Certification: Submit certification by treating plant stating chemicals and process used, net amount of salts retained, and conformance with applicable standards.
 - Preservative Treated Wood: Submit certification for water-borne preservative that moisture content was reduced to 19 percent maximum, after treatment.
 - 3. Fire Retardant Treatment: Submit certification by treating plant that fire-retardant treatment materials comply with governing ordinances and that treatment will not bleed through finished surfaces.
 - 4. Fasteners Product Data: Submit manufacturer's published literature and product data sheets.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Immediately upon delivery to job site, place materials in area protected from weather.
- B. Store materials of minimum of 6" above ground on framework or blocking and cover with protective waterproof covering, providing adequate air circulation or ventilation.
- C. Do not store seasoned materials in wet or damp areas.
- D. Protect fire-retardant materials against high humidity and moisture during storage and erection.
- E. Protect sheet materials from corners breaking and surface damage.

PART 2 – PRODUCTS

2.01 <u>MATERIALS</u>

- A. Lumber:
 - 1. Dimension:
 - a. Specified lumber dimensions are nominal.
 - b. Actual dimensions conform to industry standards established by the American Lumber Standards Committee and the rules writing agencies.
 - 2. Moisture Content:
 - a. 19 percent maximum at time of permanent closing of building or structure, for lumber 2" or less nominal thickness.
 - 3. Surfacing:
 - a. Surface four sides (S4S), unless otherwise shown, or specified.
 - 4. Framing Lumber:
 - a. 2" to 4" thick, 2" to 4" wide.
 - b. Any commercial softwood species, unless otherwise shown, or specified.

- 5. Miscellaneous Lumber:
 - a. Provide wood for support or attachment of other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members.
 - b. Provide lumber of sizes shown or specified, worked into shapes shown on Drawings.
 - c. 15 maximum moisture content for lumber items not specified to receive wood preservative treatment.
- 6. Grades:
 - a. General Framing: Standard and Better Grade.
 - b. Plates, Blocking, Bracing and nailers: Utility Grade.
 - c. Miscellaneous Lumber: Construction Grade.
- B. Plywood:
 - 1. Exterior graded plywood where indicated, or where edge or surface is permanently exposed to weather: B-B EXT-APA, graded for treatment where preservative treated plywood is indicated.
 - 2. Plywood Backing Panel: For mounting electrical or telephone equipment, provide fire-retardant treated plywood panels, APA C-D PLUGGED INT with exterior glue, thickness indicated, or if not otherwise indicated, 3/4".
- C. Preservative Treated Wood:
 - 1. Waterbourne Salt Preservatives for Painted, Stained or Exposed Natural Wood Products:
 - a. AWPB LP-2, above ground application.
 - b. AWPB LP-22, ground contact application.
 - 2. Treat indicated items and the following:
 - a. Wood sills, sleepers, blocking, furring, stripping, roofing, and similar concealed members in contact with masonry, concrete, or around windows and doors.
 - b. Use MCA (Micronized Copper Azole) preservative treatment only.
- D. Fire Retardant Treatment:
 - 1. Comply with AWPA Standards for pressure impregnation with fire retardant chemicals. a. Flame Spread: 25 max.
- E. Fasteners in Treated Wood:
 - 1. Shall be resistant to corrosion or be protected to resist corrosion.
 - 2. Where sacrificial coatings are applied to fasteners, a minimum coating thickness capable of protecting the fastener for the expected service life of the structure shall be provided. Provide manufacturer's product information, test results, and certifications to substantiate these claims.
 - 3. Coating weights for zinc-coated fasteners shall be in accordance with ASTM A153M or ASTM A641, Supplementary Requirements.
 - 4. Fasteners shall be one of the following:
 - a. Stainless steel.
 - b. Standard Single-dipped, Double-dipped, Hot-dipped, or zinc-coated galvanized steel.
 - c. Silicon bronze.
 - d. Copper.
- F. Termite Shield For Wood Construction:
 - 1. Description:
 - a. Aluminum coil stock termite shield.
 - b. .032" thick minimum.
 - 2. Requirements:
 - a. Install 6" wide under the sill plate of all exterior 2x6 wall studs.
 - b. Install 6" wide under the sill plate of all interior 2x6 wall studs.
 - c. Install 4" wide under the sill plate of all interior 2x4 wall studs.
 - d. Install in continuous sheets.

PART 3 - EXECUTION

3.01 GENERAL

- A. Discard units of material with defects which might impair quality of work, and units which are too small to fabricate work with minimum joints or optimum joint arrangement.
- B. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
- C. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
- D. Use common wire nails except as otherwise indicated. Use finishing nails for finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

3.02 INSTALLATION

- A. Wood Grounds, Nailers, Blocking and Sleepers:
 - 1. Provide where shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached.
 - Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement. Do not use power driven anchors unless approved by Architect.
 - 3. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2" wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.
 - 4. For renovation projects utilizing existing blocking, provide additional blocking as required if existing blocking is inadequate.
- B. Apply two brush coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber.

3.03 TEMPORARY WORK

A. Provide temporary stairs, ramps, runways, ladders, etc., as required for the purpose of handling materials, personnel and access to the work and temporary exits from the building.

3.04 CUTTING, FITTING AND PATCHING

A. Include all cutting, fitting and patching of work in connection with other trades which adjoin any part of this work.

SUBMITTAL CHECK LIST

- 1. Treating plant certification.
- 2. Preservative treatment certificate.
- 3. Fire retardant treatment certificate.
- 4. Fasteners product data.

SECTION 06161 – INSULATING SHEATHING

PART 1 – GENERAL

1.01 SUMMARY

A. Section includes insulating wall sheathing with integral water-resistive barrier and air barrier.

1.02 <u>REFERENCES</u>

- A. American Society of Mechanical Engineers (ASME): www.asme.org
 - 1. ASME B18.6.1 Wood Screws (Inch Series)
- B. ASTM International (ASTM): www.astm.org
 - 1. ASTM A153/A153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - 2. ASTM C1289 Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
 - 3. ASTM D779 Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method
 - 4. ASTM D1621 Test Method for Compressive Properties Of Rigid Cellular Plastics
 - 5. ASTM D2247 Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
 - 6. ASTM E96/E 96M Test Methods for Water Vapor Transmission of Materials
 - 7. ASTM E331 Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
 - 8. ASTM E2357 Test Method for Determining Air Leakage of Air Barrier Assemblies
 - 9. ASTM F1667 Specification for Driven Fasteners: Nails, Spikes, and Staples
 - 10. ASTM G154 Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials
- C. US Department of Commerce (DOC): http://gsi.nist.gov/global/index.cfm/L1-5/I2-44/A-355 1. DOC PS 2 - Performance Standard for Wood-Based Structural Panels
- D. International Code Council (ICC): www.iccsafe.org
 - 1. ICC IBC International Building Code
 - 2. ICC IRC International Residential Code for One and Two-Family Dwellings
- E. ICC Evaluation Service, Inc. (ICC-ES): www.icc-es.org
 - 1. ICC-ES AC12 Acceptance Criteria For Foam Plastic Insulation
 - 2. ICC-ES AC38 Acceptance Criteria for Water-Resistive Barriers
 - 3. ICC-ES AC116 Acceptance Criteria for Nails and Spikes
 - 4. ICC-ES AC148 Acceptance Criteria For Flexible Flashing Materials
 - 5. ICC-ES AC201 Acceptance Criteria for Staples
 - 6. ICC-ES AC269 Acceptance Criteria for Racking Shear Evaluation of Proprietary Sheathing Materials attached to Light-Frame Wall Construction or Code-Complying Sheathing Attached to Light-Framed Walls with Proprietary Fasteners
 - 7. ICC-ES AC310 Acceptance Criteria for Water-Resistive Membranes Factory-bonded to Wood-based Structural Sheathing, Used as Water-Resistive Barriers
 - 8. ICC-ES ESR-1539 Power Driven Staples and Nails for Use in Engineered and Non-Engineered Connections
 - 9. ICC-ES NER-272 Power Driven Staples and Nails for Use in All Types of Building Construction
- F. Sustainable Forestry Initiative (SFI): www.sfiprogram.org/
 - 1. SFI 2010 2014 Standard

1.03 ACTION SUBMITTALS

A. Product Data: For each type of sheathing product specified.

1.04 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: From ICC-ES, for wood sheathing and seam tape.

B. Product Certifications: From manufacturer, indicating that sheathing products comply with ICC-ES AC269 and ICC-ES AC310.

1.05 <u>CLOSEOUT SUBMITTALS</u>

A. Warranty: Executed copy of manufacturer special warranties.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Provide wood products from manufacturer certified by SFI, FSC, or comparable sustainable forestry program acceptable to Architect.
- B. Provide wall sheathing products meeting requirements for water-resistive barrier in accordance with ICC-ES AC310.
- C. Provide wall sheathing products meeting requirements of ICC-ES AC269.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written instructions for protection of sheathing products from weather prior to installation.

1.08 WARRANTY

- A. Special Manufacturer's Warranty: Manufacturer's standard form in which sheathing manufacturer agrees to repair or replace sheathing products that demonstrate deterioration or failure under normal use due to manufacturing defects within warranty period specified, when installed according to manufacturer's instructions.
 - 1. Warranty Period for Sheathing Products: [30] years following date of Substantial Completion.
 - 2. Warranty Conditions: Special warranties exclude deterioration or failure due to structural movement resulting in stresses on sheathing products exceeding manufacturer's written specifications, or due to air or moisture infiltration resulting from cladding failure or mechanical damage.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Basis-of-Design Product: Provide sheathing products manufactured by Huber Engineered Woods LLC, Charlotte NC; Phone: (800) 933-9220; Website: www.zipsystem.com.

2.02 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Assembly Air Leakage: Less than 0.04 cfm/sq. ft. at 1.57 lbf/sq. ft. (0.2 L/s x sq. m at 75 Pa), per ASTM E2375.
- B. Water-Vapor Permeance, Facer: Minimum 12 perms (689 ng/Pa x s x sq. m), ASTM E96/E96M
- C. Weather Exposure: Manufacturer warranty applies for maximum allowable exposure period of 180 days.

2.03 <u>MATERIALS</u>

- A. Oriented Strand Board: DOC PS 2, made with binder containing no added urea formaldehyde.
- B. Rigid Foam Plastic Insulating Board: Rigid polyisocyanurate foam core complying with ASTM C1289 Type II, Class 2, and ICC-ES AC12, with coated glass fiber facers on both sides, with the following characteristics:
 - 1. Nominal Density: 2.0 pcf (32 kg/cu. m).
 - 2. Compressive Strength, ASTM D1621: Not less than 20 psi (150 kPa).
 - 3. Vapor Permeance, ASTM E96/E96M: Less than 1.0 perm.
 - 4. Edge Configuration: Square finished.

2.04 COMPOSITE INSULATING WALL SHEATHING

A. Composite Insulating Wall Sheathing: Oriented-strand-board Exposure 1 sheathing 7/16 inch (11.1 mm) thick, with factory-laminated water-resistive barrier exterior facer, and with rigid foam plastic insulating board laminated to interior face.

1. Basis-of-Design Product: Provide Huber Engineered Woods LLC; ZIP System R Sheathing.

- 2. Span Rating and Performance Category of Sheathing Layer: Not less than 24/16; 7/16 Performance Category.
- 3. Thickness: 1 inch (25 mm
- 4. Thermal Resistivity (R Value): 3.6 deg F x h x sq. ft./Btu x in. at 75 deg F
- 5. Edge Profile: Square edge.
- 6. Exterior Facer: Medium-density, phenolic-impregnated polymer-modified sheet material meeting requirements for ASTM D779 Grade D weather-resistive barrier in accordance with ICC AC38 and AC310, with fastener spacing symbols on exterior facer for 16-inch (406 mm) on center spacing, with the following characteristics
 - a. Water Resistance of Coatings, ASTM D2247: Pass 14 day exposure test.
 - b. Moisture Vapor Transmission, ASTM E96: Not less than 12 perms.
 - c. Water Penetration, ASTM E331: Pass at 2.86 lbf/sq. ft. (137 Pa).
 - d. Wind Driven Rain, TAS-100: Pass.
 - e. Accelerated Weathering, ASTM G154: Pass.

2.05 <u>FASTENERS</u>

- A. Fasteners, General: Size and type complying with manufacturer's written instructions for Project conditions and requirements of authorities having jurisdiction.
 - 1. Corrosion Resistance: [Hot-dip zinc coating, ASTM A153/A 153M] [or] [Type 304 stainless steel].
- B. Nails, Brads, and Staples: ICC AC116 and ICC AC201.
- C. Power-Driven Fasteners: ICC-ES-1539 or NER-272.
- D. Wood Screws: ASME B18.6.1.

2.06 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIAL

- A. Self-Adhering Seam and Flashing Tape: Pressure-sensitive, self-adhering, cold-applied, seam tape consisting of polyolefin film with acrylic adhesive, meeting ICC AC148.
 - 1. Basis-of-Design Product: Provide Huber Engineered Woods; ZIP System Tape.
 - 2. Thickness: 0.012 inch (0.3 mm).

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine framing spacing and alignment to determine if work is ready to receive sheathing. Proceed with sheathing work once conditions meet requirements.

3.02 SHEATHING INSTALLATION

- A. Install sheathing panels in accordance with manufacturer's written instructions, requirements of applicable Evaluation Reports, and requirements of authorities having jurisdiction.
- B. Air and Moisture Barrier: Coordinate sheathing installation with flashing and joint sealant installation and with adjacent building air and moisture barrier components to provide complete, continuous air- and moisture- barrier.
- C. Do not bridge expansion joints; allow joint spacing equal to spacing of structural supports
- D. Install panels with laminated facer to exterior. Stagger end joints of adjacent panel runs
- E. Attach sheathing panels securely to substrate with manufacturer-approved fasteners in compliance with the following:
 - 1. ICC-ES ESR-1539 or ICC-NES NER-272 for power-driven fasteners.
 - 2. IBC: Table 2304.9.1 Fastening Schedule.
- F. Apply seam tape at all panel seams, penetrations, and facer defects or cracks to form continuous weathertight surface. Apply tape according to manufacturer's written instructions and requirements of ICC-ES applicable to tape application.

SECTION 06190 - PREFABRICATED WOOD TRUSSES

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Pre-engineered, prefabricated wood floor trusses, roof trusses, truss girders, truss bracing and bridging, and all connections, including those between the trusses and common building framing, as indicated on the Drawings and specified herein.
 - B. Drawings indicate overall intent, and may include profiles and dimensions of trusses for communication of intent only.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 06100 - Rough Carpentry.

1.03 QUALITY ASSURANCE

- A. Conform to the following design standards:
 - 1. "National Design Specification for Wood Construction", published by the National Forest Products Association.
 - 2. "Design Specification for Metal Plate Connected Wood Trusses", published by the Truss Plate Institute (TPI).
 - 3. "American Institute for Timber Construction" (AITC).
 - 4. All applicable state and local building codes.
- B. Provide trusses fabricated in accordance with designs prepared under the supervision and bearing the seal of a Professional Structural Engineer, registered in the state of project location.
- C. Conform to the following Fabrication and Erection Standards:
 - 1. "Bracing Wood Trusses", published by the TPI.
 - 2. "Quality Control Manual", published by TPI.
- D. Design trusses to the following loads and requirements, unless indicated otherwise on the Drawings:

20 psf.

20 psf.

C.

L/240 maximum.

- 1. Live Load Deflection Criteria =
- 2. Total Load Deflection Criteria = L/180 maximum.
- 3. Roof: Top Chord Live Load =
- 4. Roof: Top Chord Dead Load =
- 5. Roof: Bottom Chord Dead Load = 10 psf.
- 6. Wind = 90 mph.
- 7. Exposure =
- 8. Design all truss connector plates using an extra safety factor of 1.20 in addition to the standard design requirements listed above.
- 9. Camber Trusses to equal the dead load deflection.

1.04 SUBMITTALS

- A. Shop Drawings:
 - 1. Details and elevations on the Drawings are diagrammatic and are intended to span the basic intent of the truss requirements for design by the truss manufacturer.
 - 2. Submit shop drawings for review of intent, profiles and overall dimensions to verify conformance with the design intent, and not for structural capability of design.
 - 3. Indicate length, depth, bearing points, pitch, span, profile, quantity, components, grades, configuration, required openings and critical dimensions.
 - 4. Prepare drawings for field erection. Mark and locate all trusses on Drawings. Indicate all bracing

and anchoring.

B. Engineer's Certification:

- 1. Shop drawings and design load calculations shall be prepared, stamped and certified by a Structural Engineer registered to practice in the State of the project location.
- 2. Structural Engineer shall be hired by the truss manufacturer and shall oversee design of the structural requirements, truss components and connection members.
- 3. Design truss and wood framing connections in accordance with all requirements of the "Truss Plate Institute", the "National Forest Products Association" and the "American Institute for Timber Construction".
- 4. Design calculations shall indicate vertical displacement due to loading conditions.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Handle prefabricated trusses to avoid damage, and in accordance with manufacturer's instructions.
- B. Protect trusses from construction operations.
- C. Replace damaged trusses. Do not attempt to repair damaged prefabricated trusses.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Lumber:
 - 1. Species, and grade as required for design load.
 - 2. All lumber for chords and webs to be No. 2 or Better. No. 3 lumber is NOT permitted.
 - 3. Nominal thickness: 2 inches.
 - 4. Nominal width: as required for design load.
- B. Metal Connector Plates:
 - 1. Minimum thickness: 0.036 inches.
 - 2. ASTM A446, Grade A.
 - 3. Hot Dip Galvanized per ASTM A525, G60.
- C. Connections between wood trusses and common lumber framing shall be made with the appropriate "Simpson" Strong-Tie anchor and connector.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Field verify all dimensions and conditions prior to fabrication.
- B. Wood trusses shall NOT be assumed structurally stable until all members are in place. Any use of the partially erected framework for temporary support of any kind shall be done only at the sole risk of the Contractor.

3.02 FABRICATION

- A. Fabricate trusses with wood chords and metal or wood webs in accordance with designs certified by the Structural Engineer.
- B. Fabricate and install metal connector plates in accordance with latest edition of "Truss Plate Institute"

Standards and Procedures.

- C. Fabricate and install truss and wood framing connections in accordance with all requirements of the "Truss Plate Institute", the "National Forest Products Association" and the "American Institute for Timber Construction".
- D. Multiple trusses, double or triple trusses, shall be utilized, as required, to maintain deflection limits.

3.03 ERECTION

- A. Install trusses in accordance with manufacturer's instructions, recommendations and design.
- B. Hoist trusses into position so as to prevent damage and minimize out-of-plane bending.
- C. Install temporary horizontal and cross bracing to hold trusses plumb and in safe.
- D. Install permanent bracing and related components prior to application of loads to trusses.
- E. Restrict construction loads to prevent over stressing of truss members.
- F. Do not cut or remove truss members or metal connector plates.

SUBMITTAL CHECK LIST

- 1. Shop Drawings.
- 2. Engineer's Certification.

SECTION 06200 - FINISH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Carpentry work which is exposed to view, as shown on the Drawings and specified herein.

- B. Solid Surface window sills throughout the project as indicated on the Drawings.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 06100 - Rough Carpentry Section 06400 - Architectural Woodwork Section 08710 - Finish Hardware Section 09900 - Painting

1.03 QUALITY ASSURANCE

- A. Comply with the latest edition of the Architectural Woodwork Standards (AWS) "Quality Standards". References to Premium, Custom, or Economy in this specification are to be as defined in this publication.
- B. Factory mark each piece of lumber and plywood with grading information, except for surfaces to receive transparent finish.
- C. Mark each unit of fire-retardant treated lumber and plywood with Underwriter's Laboratory Classification marking.

1.04 SUBMITTALS

- A. Submit the following:
 - 1. Shop Drawings of all finish carpentry items of sufficient detail and scale to show compliance with design intent and specified quality grades.
 - Samples of all finish materials for colors, patterns and finishes as specified. For colors, patterns and finishes not specified, submit samples of manufacturer's entire selection for selection by Architect.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver woodwork, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas.

1.06 PROJECT CONDITIONS

- A. Conditioning: Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
- B. Maintain temperature and humidity in installation area as required to maintain a moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Solid Wood for Transparent Finish:
 - 1. Select Red Oak, AWS Premium Grade.
 - 2. Plain Sliced as selected by Architect.
- B. Veneer Wood for Transparent Finish:
 - 1. Select Red Oak, AWS Premium Grade.
 - 2. Plain Sliced as selected by Architect.
 - 3. Veneer thickness shall not be less than 1/20 in. before sanding.
 - 4. Veneer matching to be determined by fabricator, for best visual effect, depending upon flitch width and grain character.
 - 5. Refer any questions and about best visual effect to Architect for resolution as work progresses.
- C. Hardwood Plywood:
 - 1. Product Standard PS 51.
- D. Softwood Plywood:
 - 1. Product Standard PS 1.
- E. Solid Wood for Painted Finish:1. Poplar, AWS, Custom Grade.
- F. Particle Board:
 - 1. Medium Density, Type 1-M-2.
 - 2. Thickness as indicated on the Drawings. If not indicated, provide 3/4" standard.
- G. Provide kiln-dried (KD) lumber with an average moisture content range of 6% to 11% for interior work. Maintain temperature and relative humidity during fabrication, storage and finishing operation so that moisture content values for woodwork at the time of installation do not exceed 5% to 10%.
- H. Miscellaneous Materials:
 - 1. Provide nails, screws and other anchoring devices to provide secure, concealed attachment.
 - 2. Where finish carpentry is exposed to exterior or areas of high humidity, provide fasteners with hot-dipped zinc coating (ASTM-A153).
- I. Fire Treated Wood:
 - 1. ASTM E84
 - 2. Flame Spread 25 max.
 - 3. Kiln-dried after treatment to 15% max. moisture content.
- J. Fasteners and Anchors:
 - 1. Size and type as required for each use.
 - 2. Provide non-ferrous or hot-dip galvanized anchors and fasteners for all exterior applications.
- K. Solid Surface Window Sills:
 - 1. Acceptable Manufacturers and Products:
 - a. "Dupont", "Corian".
 - b. "Wilsonart", "Gibraltar".
 - c. "Formica", "Formica Solid Surfacing".
 - d. "Meganite", "Meganite".

- e. "Avonite Surfaces", "Avonite".
- f. "LG Hausys", "Acrylic Solid Surface".
- g. "Hanwha L&C", "Hanex Solid Surface".
- 2. 3/4" total sill thickness provided from one of the following, depending on color availability:
 - a. 3/4" thick solid surface material.
 - b. 1/4" thick solid surface material laminated atop 1/2" plywood or hardboard with edge bandings of 3/4" solid surface material.
- 3. Provide 1/2" thick apron below entire exposed edge of sill, 2" deep unless indicated otherwise.
- 4. All sills and aprons to have eased exposed edges.
- 5. Extend sill 1/2" beyond face of apron, unless indicated otherwise.
- 6. Color as indicated on Drawings, or to be selected by Architect from manufacturer's entire selection.

2.02 FABRICATION

- A. Fabricate standing and running trim of solid wood for transparent and opaque finish in accordance with AWS Section 300, Premium Grade.
- B. Fabricate standing and running trim including sill, chair rail and railings to dimensions, profiles, and details shown. Rout or grove reverse side (backed-out) of trim members to be applied to flat surface, except for members with ends exposed in finish work. Miter corners and reinforce. Miters shall be well formed and in true alignment.
- C. Fabricate flush veneer laminated paneling on interior hardwood plywood with veneer for transparent finish specified. Veneers shall be center matched. Panels shall be book matched and where they occur end to end they shall be end matched. Paneling shall conform with AWS Section 500A, Premium Grade.
- D. Closet shelving up to 12 inches in width may be cut from solid wood for painted finish, or fabricated from particle board or plywood as specified for wider shelves. Shelves greater than 12 inches in depth shall be fabricated from particle board or plywood with glued solid lumber edge band in accordance with AWS Section 600, Custom Grade.
- E. Provide solid hardwood edge banding on all exposed edges of finish carpentry.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

- A. Condition wood materials to average prevailing humidity of installation area prior to installing.
- B. Discard unsuitable materials and remove from job site.

3.02 INSTALLATION

- A. Install work in as large sizes as practical, in order to minimize the number of joints. Install trim using full length pieces from largest length lumber available. Stagger joints in adjacent and related members.
- B. Install work plumb, level, true and straight. Shim as required using concealed shims.
- C. Scribe and cut work to fit adjoining surfaces.
- D. Miter trim at corners, cope at returns. Use scarf joints for end to end joints.
- E. Install fire-retardant treated wood in accordance with manufacturer's directions and as required to meet required classification or rating. Provide special fasteners, molding, adhesives and other accessories for rating and fire-retardant material indicated.

FINISH CARPENTRY

THE VILLAGE @ WEST JEFFERSON Louisville, Kentucky

F. Anchor finish carpentry work to anchorage devices or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where pre-finished matching fastener heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with surface, so that nail is not noticeable after surface is painted or stained.

3.03 ADJUSTING AND CLEANING

- A. Repair or replace defective finish carpentry work to eliminate functional and visual defects.
- B. Adjust joinery for uniform appearance.
- C. Refer to Division 9 sections for final finishing.

3.04 PROTECTION

- A. Protect all work from damage until time of substantial completion.
- B. Maintain conditions necessary to prevent deterioration of work.
- C. Repair or replace damaged work and finishes.

SUBMITTAL CHECK LIST

- 1. Shop Drawings.
- 2. Samples.

SECTION 06400 - ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Architectural Woodwork as shown on the Drawings and specified herein, including:
 - 1. Custom Cabinets and Casework:
 - a. Wood Cabinets Plastic Laminate Faces.
 - b. Wood Cabinets Shop Finished.
 - c. Plastic Laminate Countertops For Custom Cabinets and Casework.
 - d. Solid Surface Countertops For Custom Cabinets and Casework.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- Section 06100 Rough Carpentry.
- Section 06200 Finish Carpentry.
- Section 08211 Flush Wood Doors.
- Section 08710 Finish Hardware.
- Section 09900 Painting.

Division 15: Plumbing and Mechanical components, connections, taps, disposals, coordination. Division 16: Electrical components, connections, and coordination.

1.03 QUALIFICATIONS

- A. Supplier's Qualifications:
 - 1. Shop of manufacturer should be certified by the Architectural Woodwork Standards (AWS), and be capable of providing proof of such certification upon request.

1.04 QUALITY ASSURANCE

- A. Comply with the latest edition of the Architectural Woodwork Standards (AWS) "Quality Standards". References to Premium, Custom, or Economy in this specification are to be as defined in this publication.
- B. Provide items and work of the quality grade indicated, or if not indicated, of Custom grade.
- C. Provide items and installation of straight, flat, level, plumb, and true quality and craftsmanship. Items provided that create an installation not acceptable for these reasons, or otherwise deemed unacceptable for purposes of aesthetics or maintenance, shall be removed and replaced by the Contractor without additional costs to the Owner. Final determination shall be made by the Architect.
- Any inconsistencies or irregularities in the surface or product will be cause for rejection.
 All rejected products shall be removed and replaced with new at no additional cost to the Owner.
 The evaluation of acceptance and rejection is at the sole discretion of the Architect.

1.05 <u>SUBMITTALS</u>

- A. Samples:
 - 1. Complete range of manufacturer's standard finishes where colors or finishes are not specified.
 - 2. Samples of specified items only, where colors or finishes have been indicated.
 - 3. Samples of each type, material, color, pattern and finish of all countertops and surfaces specified.
- B. Shop Drawings:
 - 1. Field measurements shall be taken to verify that architectural woodwork, cabinets and casework will fit into designed space. Entryways, corridors, and door openings shall be verified to ensure that the equipment be manufactured in a manner to permit it to be moved through properly into place.

- 2. Show layout of architectural woodwork, cabinets and casework with product reference numbers, details of construction, dimensions, elevations, rough-ins, materials, finishes, hardware, and accessories.
- 3. Reference Architect's nomenclature of product identification as indicated on the Drawings.
- 4. Shop drawings on all architectural woodwork items, of sufficient detail and scale to determine compliance with design intent and specified quality grades.
- 5. Manufacturer's descriptive literature of specialty items not manufactured by the architectural wood worker.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver woodwork, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas.
- C. Deliver architectural woodwork, cabinets and casework as needed for immediate installation whenever possible. Any items delivered ahead of time for installation shall be stored by Contractor until project areas are ready for installation.

1.07 PROJECT CONDITIONS

- A. Conditioning: Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
- B. Maintain temperature and humidity in installation area as required to maintain a moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period.

1.08 WARRANTY

A. Architectural woodwork, cabinets and casework contractor shall guarantee to replace or repair, at no expense to the Owner, all materials of this contract found to be defective within one year of acceptance (Substantial Completion), due to defective materials and/or workmanship.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Exterior Wood for Opaque Finish:
 - 1. Any softwood species, AWS Custom Grade.
- B. Interior Wood for Transparent Finish:
 - 1. Select Red Oak, AWS Premium Grade.
 - 2. Plain Sliced as selected by Architect.
- C. Interior Wood for Painted Finish:1. Poplar, AWS, Custom Grade.
- D. Veneer Wood for Transparent Finish:
 - 1. Select Red Oak, AWS Premium Grade.
 - 2. Plain Sliced as selected by Architect.
 - 3. Veneer thickness shall not be less than 1/20 in. before sanding.
 - 4. Veneer matching to be determined by fabricator, for best visual effect, depending upon flitch width and grain character.
 - 5. Refer any questions and about best visual effect to Architect for resolution as work progresses.

- E. Hardwood Plywood:1. Product Standard PS 51.
- F. Softwood Plywood:
 - 1. Product Standard PS 1.
- G. Treated Paper Surfaced Plywood:
 - 1. Resin-Fiber overlaid plywood, un-grooved panel.
- H. Plastic Laminate:
 - 1. Acceptable Manufacturers:
 - a. "Formica"
 - b. "Wilsonart"
 - c. "Nevamar"
 - d. "Pionite"
 - 2. Comply with NEMA LD-3 for type, thickness, color, pattern, and finish as indicated for each application.
 - 3. Provide high pressure laminate in grades indicated for the following types of surfaces:
 - a. Horizontal Surfaces High-pressure decorative laminate HGS-50 (0.050").
 - b. Vertical Surfaces: High-pressure decorative laminate VGS-28 (0.028").
 - c. Exposed Cabinet Body Exterior: High-pressure decorative laminate VGS-28 (0.028").
 - d. Door and Drawer Fronts: High-pressure decorative laminate VGS-28 (0.028").
 - e. Exposed Cabinet Body Interior: High-pressure decorative laminate VGS-28 (0.028").
 - f. Semi-Exposed Cabinet Body Interior: Thermally-fused melamine laminate with CL-20 cabinet liner at surface required to achieve true balanced construction, manufacturer's standard "white" in color.
 - g. Interior Concealed Surfaces: Thermally-fused melamine laminate, manufacturer's standard "white" in color.
 - 4. Balanced construction of both faces of surfaces is required.
 - 5. Laminate grain patterns are to run vertically and be vertically matched within each unit.
 - 6. Chemical resistant type finish protection where specified, to equal or exceed "Formica", "Chemtop".
- I. Solid Surfacing Material:
 - 1. Acceptable Manufacturers and Products:
 - a. "Dupont", "Corian".
 - b. "Wilsonart", "Gibraltar".
 - c. "Formica", "Formica Solid Surfacing".
 - d. "Meganite".
 - e. "Avonite Surfaces", "Avonite".
 - f. "LG Hausys", Acrylic Solid Surface.
 - 2. 1/2" thick for countertops, installed over particleboard backer, for total thickness of 1".
 - 3. 1/2" thick for edge banding, and to provide a face depth of 1", unless indicated otherwise.
 - 4. 1/2" thick for backsplashes and end splashes, 4" high unless otherwise noted.
 - 5. 1/2" thick for window sills, unless otherwise noted.
- J. Quartz Material:
 - 1. Acceptable Manufacturers and Products:
 - a. "Zodiaq" by "Dupont".
 - b. "Silestone" by "Cosentino".
 - c. "Cambria".
 - d. "Caesarstone International".
 - 2. 3/4" or 1-1/8" thick for countertops.

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- 3. 3/4" thick for backsplashes and end splashes, 4" high unless otherwise noted.
- 4. Edge Profile: Straight bevel, Basic Eased, Bullnose, Ogee, Mitred.

K. Particle Board:

- 1. Industrial grade engineered board core material.
- 2. 47 pound density, non-telegraphing.
- 3. 3/4" thick, medium density particleboard, Type 1-M-2.
- 4. 1/2" thick minimum, medium density particleboard, Type 1-M-2, under solid surfacing countertops.
- L. Accessories:
 - 1. Fillers, tops, end and side closures; finish to match adjacent cases, cabinets and countertops.
 - 2. Finished back and end panels as required or indicated.
 - 3. Back splashes on all countertops. End splashes only as specified.
- M. Wood or Plastic Laminate Shelving:
 - 1. Fully adjustable, typically.
 - 2. Fixed where required for unit stability and/or positive door latching.
 - 3. 1" actual thickness over 36" wide, 3/4" actual thickness less than 36" wide.
- N. Glass Doors and Fronts:
 - 1. Shall be 1/4" laminated safety glass, double strength.
 - 2. Polished at all edges.
 - 3. Tempered to 4 x normal flexural strength.
- O. Glass Shelves:
 - 1. Shall be 1/4" laminated safety glass, double strength.
 - 2. Polished at all edges. Eased and polished at front edge.
 - 3. Tempered to 4 x normal flexural strength.
- P. Edge Trim:
 - 1. Material:
 - a. 1mm (.020" actual) rigid PVC banding, stain finish, machine applied.
 - b. 3mm rigid PVC banding, stain finish, machine applied with 3mm radius edge profile.
 - 2. 3mm PVC banding at edges of doors and drawers.
 - 3. 3mm PVC banding at edges of countertops, including splashes, typical.
 - 4. 1mm PVC banding at edges of shelves, front and back.
 - 5. 1mm PVC banding at all other case and leading edges.
- Q. Fasteners and Anchors:
 - 1. Size and type as required for each use.
 - 2. Provide non-ferrous or hot-dip galvanized anchors and fasteners for all exterior applications.
- R. Colors:
 - 1. Colors as selected from manufacturer's entire selection, no limit on number of colors selected.
 - 2. If colors are indicated on the Drawings, colors and patterns must be matched.
 - 3. For purposes of color selections, countertops shall include all splashes, aprons, supports and cleats where no base units are provided, unless noted otherwise.
 - 4. For purposes of color selections, all fillers and panels shall match adjacent exposed cabinet faces.

2.02 <u>HARDWARE</u>

- Pulls for drawers and doors shall be of clean, modern design offering a comfortable hand grip and shall attach to drawer or door with machine screws on 4" centers.
 Pulls shall be of extruded aluminum with satin lacquer finish.
 All pulls shall be centered on all drawer fronts.
- B. Latching assembly for tall case double swinging doors shall consist of an eccentric plate operating two 1/8" x 5/8" plated vertically operating locking bars. Each bar shall operate through an extruded nylon guide and, when locked, shall engage a strike plate providing positive latching for the left hand door. The lock attached to the right hand door shall operate a bolt which, when locked, shall overlap the left hand door providing secure locking. Single doors shall be locked to case sides.
- C. Hinges shall be five knuckle institutional type heavy-duty hinges, concealed. Hinges shall be 2-1/2" chrome, satin finish. Hinges are to be mounted to door and case with not less than three screws per wing.
- D. Catches shall be provided on swinging doors and shall be a spring-loaded nylon roller type.
- E. Provide cork, plastic, or rubber type silencers on all drawers and doors.
- F. Door and Drawer Locks:
 - 1. Locks shall be furnished on all doors and drawers throughout, unless indicated otherwise.
 - 2. Locks shall be standard disc tumbler with removable core (cam style), master keyed and furnished with two keys per lock.
 - 3. Locks used for double door applications shall be capable of securing both doors simultaneously without the need for additional elbow or deadbolt catches or bolt on the passive door.
 - 4. Furnished with two keys per lock. Master key as required.
 - 5. Unless otherwise specified, key casework per the following requirements:
 - a. Science labs shall have all doors and drawers keyed individually within room with a master key for entire room.
 - b. All other spaces shall have all doors and drawers keyed alike within entire room.
 - c. Provide grandmaster key to operate all locks of all master keys for all spaces.
- G. Provide epoxy coated steel drawer slides with nylon rollers and self-closing feature at all standard and file drawers. Drawer slide load capacity to be 100 lb. static load rating, minimum and 150 lb. static load rating, minimum at all file drawers. Provide with full extension of drawer body beyond the face of the cabinet; 3/4 extension slides are not acceptable.
- H. Drawer stops shall be provided on all drawers to prevent inadvertent removal. Stops shall be automatic type, zinc plated steel.
- Shelf supports shall be die-formed to insert into pre-drilled holes on interior of cases and cabinets. Supports shall provide shelf adjustment on 32 mm centers. Shelf supports shall be plated steel. Shelves longer than 48" shall have additional support at center and at 24" maximum spacing otherwise.
- J. Shelf brackets and standards shall be installed so as to set standards flush with the finished interior surfaces of cases and cabinets.
 Heavy-duty slotted recessed metal standards shall provide shelf adjustment on maximum 1" centers.
 Shelf support brackets shall be plated steel and designed specifically for type of shelf material.
 Shelves longer than 48" shall have additional support at center and at 24" maximum spacing otherwise.

- K. Sliding door hardware shall be extruded aluminum channel box track design, top and bottom of all doors. Provide single channel, by-pass or pocket type track design as applicable for each application. Provide wheel hangers and quantity as required by manufacturer's literature for material type and weight of door. Provide all parts and components for full system, including such items as hangers, guides, spacers, bumper stops, and the like.
- L. Chain stops shall be provided at the top of all doors to all tall cabinets. Provide chain stops at the top of all doors to all base and wall cabinets that open directly into a wall surface or obstruction. Finish of stops to match hinges.

2.03 FABRICATION

- A. Custom Cabinets and Casework:
 - 1. Fabricate in compliance with AWS Premium Grade for all cases and cabinets.
 - 2. Fabricate in compliance with AWS Premium Grade for plastic laminated tops.
 - 3. Conform to Full Flush Overlay design details for all doors and drawers.
 - 4. Fabricate in shop in largest units possible.
 - 5. Machine for all hardware in shop.
- B. Miscellaneous Ornamental Work:
 - 1. Fabricate in compliance with AWS Section 700, Premium Grade.
- C. Stairwork and Handrails:
 - 1. Fabricate in compliance with AWS Section 800, Premium Grade.
- D. Factory Finishing:
 - 1. To greatest possible, finish architectural woodwork at shop or factory.
 - 2. Comply with AWS Section 1500 requirements for finishes specified.
 - 3. Transparent Finish: For kitchens, labs, restrooms, locker rooms, showers and other areas of high moisture and chemical contact, use AWS Finish System #2, Catalyzed Lacquer, Premium Grade. For all other areas, use AWS Finish System #1, Lacquer Standard, Custom Grade.
 - 4. Opaque Finish: For kitchens, labs, restrooms, locker rooms, showers and other areas of high moisture, use AWS Finish System #7, Lacquer Standard, Premium Grade. For all other areas, use AWS Finish System #7, Custom Grade.
- E. Joinery:
 - 1. Handwrap fluted dowel construction.
 - 2. 8mm minimum.
 - 3. Doweled and glued.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Field measure all areas to receive architectural woodwork prior to fabrication. Provide any necessary closures and trim to fit the items to enclosing walls. Provide other trades with information necessary for proper completion of related work.
- B. Not all details of millwork are shown on the Drawings. Utilize the most advantageous manufacturing processed to achieve the quality and design intent indicated.
- C. Install architectural woodwork only after flooring and wet work have been finished and proper heat and ventilation have been provided to maintain a uniform heat with not more than 50 percent relative humidity. Allow 7 days of storage of architectural woodwork in area in which it is to be installed to permit wood to reach optimum moisture content.

D. All laminated doors and drawers to be laminated <u>all</u> sides with GP-50, 0.50" thick.

3.02 INSTALLATION

- A. Exercise care to avoid damage to finished surfaces during handling and erection. Repair all damaged surfaces and blemishes arising from such operation. Replace items which cannot be satisfactorily repaired.
- B. Install paneling in correct position with concealed mechanical fastenings. Provide a minimum of nine (9) mechanical fasteners per wall panel unit, installed in such a way as to draw the panel uniformly tight to the supporting framework.
- C. Install all scribe strips accurately fitted to adjacent surfaces and securely anchored in position.
- D. Field modify architectural woodwork to accommodate conduits, piping, etc., in a neat and workmanlike manner.
- E. Attach all casework to floors and walls and anchor by concealed bolts or wood screws into inserts on floors and grounds, blocking, and nailers on walls. Provide all grounds, blocking, and nailers as necessary for all items. Trim and finish cabinets with scribe members for a neat and finished installation. Furnish hardware as specified. Equip each cabinet door with cabinet hinges, silencers, magnetic catch and pull. Mount each drawer on drawer slides and provide with a pull and silencers. Install adjustable standards and supports for adjustable shelves.
- F. Install casework so that doors will fit openings properly and be accurately aligned. Adjust hardware to center doors and provide unencumbered operation.

3.03 ADJUSTING AND CLEANING

- A. Repair damaged and defective woodwork properly to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean hardware, lubricate and make final adjustments for proper operation.
- C. Clean all woodwork and cabinets on exposed and semi-exposed surfaces, inside and out. Touch-up shop-applied finishes to restore damaged or soiled areas. Clean all plastic laminate with mild abrasive cleaner and polish with "Cabinet Magic" or similar laminate polish product.
- D. Complete the finishing work specified as work of this section, to whatever extent not completed at shop or prior to installation of woodwork.

3.04 PROTECTION

A. Protect architectural woodwork so that it is without damage or deterioration at time of substantial completion.

SUBMITTAL CHECK LIST

- 1. Samples.
- 2. Shop Drawings.
- 3. Manufacturer's Literature.

END OF SECTION 06400

SECTION 06910 - EXTERIOR SYNTHETIC TRIM

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Exterior synthetic (poly-ash) trim.
- 1.02 <u>RELATED REQUIREMENTS</u> Section 09900 – Painting: Painting exterior synthetic trim.

1.03 REFERENCE STANDARDS

- A. ASTM C 1185 Standard Test Methods for Sampling and Testing Non-Asbestos Fiber-Cement Flat Sheet, Roofing and Siding Shingles, and Clapboards.
- B. ASTM D 570 Standard Test Method for Water Absorption of Plastics.
- C. ASTM D 1761 Standard Test Methods for Mechanical Fasteners in Wood.
- D. ASTM D 6341 Standard Test Method for Determination of the Linear Coefficient of Thermal Expansion of Plastic Lumber and Plastic Lumber Shapes Between -30 and 140°F (-34.4 and 60°C).
- E. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
- F. AWPA E1 Standard Method for Laboratory Evaluation to Determine Resistance to Subterranean Termites.
- G. AWPA E10 Standard Method of Testing Wood Preservatives by Laboratory Soil-Block Cultures.

1.04 SUBMITTALS

- A. Comply with Section 01330 Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including installation instructions.
- C. Samples: Submit manufacturer's sample of exterior synthetic trim, minimum 1 inch by 4 inches by 8 inches long.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Warranty Documentation: Submit manufacturer's standard warranty.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in protective covering until installation.
 - 3. Store materials in clean, dry area.
 - 4. Store exterior synthetic trim on flat, level surface.
 - 5. Keep exterior synthetic trim covered and free of dirt and debris.
 - 6. Protect materials and finish during storage, handling, and installation to prevent damage.

1.06 WARRANTY

- A. Warranty Period for Exterior Synthetic Trim: 20-year limited warranty.
 - 1. No decay due to rot.
 - 2. No excess swelling from moisture.
 - 3. Resist termite damage.

PART 2 - PRODUCTS

- 2.01 MANUFACTURER
 - A. Boral Composites Inc., 200 Mansell Court East, Suite 305, Roswell, Georgia 30076. Toll Free 888-926-7259. www.BoralTruExterior.com. info@TruExterior.com.

2.02 EXTERIOR SYNTHETIC TRIM

- A. Exterior Synthetic (Poly-ash) Trim: Boral TruExterior® Trim.
- B. Composition:
 - 1. Post-Industrial Recycled Content: Minimum 70 percent, by weight.
 - 2. Post-Consumer Recycled Content: Minimum 2 percent, by weight
 - 3. Pigments and dyes.
- C. Physical Properties:
 - 1. Density, ASTM C 1185: 40 to 50 pcf.
 - 2. Water Absorption, ASTM D 570: Less than 1.5 percent.
 - 3. Fungi Rot, AWPA E10:
 - a. White Rot: Negligible loss.
 - b. Brown Rot: Negligible loss.
 - 4. Termite Resistance, AWPA E1: Greater than 9.0, with 10 being impervious.
- D. Mechanical Properties:
 - 1. Flexural Strength, ASTM C 1185: Greater than 1,600 psi.
 - 2. Nail Withdrawal, ASTM D 1761: Greater than 40 lbf/in.
- E. Thermal Properties:
 - 1. Coefficient of Linear Expansion, ASTM D 6341, Typical: 1.40E-05 in/in/degree F, tested at minus 30 to 140 degrees F.
 - 2. Flame Spread, ASTM E 84: Between 25 and 29
 - 3. Smoke Developed, ASTM E 84: Less than 450.
- F. Trim Sizes:
 - 1.

Nominal Size	Actual Size
1 by 4	3/4" by 3-1/2"
1 by 6	3/4" by 5-1/2"
1 by 8	3/4" by 7-1/4"
1 by 10	3/4" by 9-1/4"
1 by 12	3/4" by 11-1/4"
5/4 by 4	1" by 3-1/2"
5/4 by 6	1" by 5-1/2"
5/4 by 8	1" by 7-1/4"
5/4 by 10	1" by 9-1/4"
5/4 by 12	1" by 11-1/4"
5/8 by 6 Beadboard	5/8" x 5-1/4"

2. Manufacturing Tolerances:

- a. Width: Plus or minus 1/16 inch.
- b. Thickness: Plus or minus 1/16 inch.
- c. Length: Plus 2 inches, minus 0 inch.
- d. Edge Cut: Plus or minus 2 degrees.
- 3. Exposed Texture: [Woodgrain] [Smooth]. Verify with Architect and Owner.

2.03 FINISHES

- A. Primer:
 - 1. Acrylic based.
 - 2. Low VOC.
 - 3. Factory applied on all sides.

2.04 FASTENERS

- A. Type: Screws
 - 1. Size: Minimum 16 gage fasteners with head and finish suitable for the environment and specific application. Fasteners should be installed with adequate penetration to hold solid substrate.
 - 2. Finish: Stainless steel.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine surfaces to receive exterior synthetic trim.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

- A. Install exterior synthetic trim in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Do not install exterior synthetic trim in structural or load-bearing applications.
- C. Install exterior synthetic trim plumb, level, and square.
- D. Install exterior synthetic trim with flush, tight joints.
- E. Install Fasteners:
 - 1. Maximum of 24 inches on center.
 - 2. Within 2 inches of end of boards.
- F. Fill nail and screw holes with acrylic caulk, wood filler, or auto body filler.
- G. Repair minor damages to exterior synthetic trim in accordance with manufacturer's instructions and as approved by Architect.
- H. Remove and replace damaged exterior synthetic trim that cannot be successfully repaired as determined by Architect.

I. Painting:

- 1. Apply top coat to exterior synthetic trim over factory-applied primer.
 - a. Within 150 days of installing trim.
 - b. As specified in Section 09900.
 - c. Failure to paint the exterior synthetic trim will void the warranty.

3.03 PROTECTION

A. Protect installed exterior synthetic trim to ensure that, except for normal weathering, trim will be without damage or deterioration at time of Substantial Completion.

END OF SECTION 06910

SECTION 07130 - SELF-ADHERING SHEET WATERPROOFING MEMBRANE

PART 1 – GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Self-adhering SBS modified bitumen asphalt waterproofing membrane rated for exterior, below grade applications.
 - 2. Application on masonry or concrete surfaces where indicated on drawings.
 - 3. Related Documents: The Contract Documents, Apply to the Work of this Section. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
- B. Areas of Installation:
 - 1. In general, this system is to be installed on all walls where one surface (interior or exterior) of the wall is below-ground while the opposing surface is above finish floor elevation.
 - 2. Drawings indicate general intent of areas of installation, but cannot indicate or detail every specific location required.
 - 3. Provide this system at all elevator pits and shaft locations, whether indicated or not.

1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM D 412 (C): Specification for percent of elongation to ultimate failure of prefabricated, reinforced, polymermodifed bituminous sheet membranes used for waterproofing applications.
 - 2. ASTM D 5147: Specification for percent of elongation to ultimate failure of rubberized asphalt membrane.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Provide manufacturer's published product data and cutsheets.
 - 2. Provide properties of primer, bitumen, and mastics.
 - 3. Material Safety Data Sheets (MSDS).
- B. Samples:
 - 1. Submit representative samples of the membrane for approval.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in labeled packages and in manufacturer's original sealed containers, undamaged and with seals and labels intact.
- B. Store and handle in strict compliance with manufacturer's instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations.
 - 1. Provide covers and tarps on top and all sides, allowing for adequate ventilation.
 - 2. Protect boards, primer, mastic and adhesive from moisture and potential sources of ignition.
- C. Remove damaged material from the site and dispose of in accordance with applicable regulations.
- D. Sequence deliveries to avoid delays, but minimize on-site storage.

1.05 PROJECT CONDITIONS OR SITE CONDITIONS

- A. Perform work only when existing and forecasted weather conditions are within the limits established by the manufacturer of the materials and products used.
- B. Proceed with installation only when substrate construction and preparation work is complete and in condition to receive the self-adhering sheet waterproofing membrane system.

PART 2 - PRODUCTS

2.01 SELF-ADHERING SHEET WATERPROOFING MEMBRANE

- A. Provide one of the following approved products:
 - 1. "Tremco"; Tamko TW-60.
 - 2. "Soprema"; Colphene ICF.
 - 3. "WR Meadows/Sealtight"; Mel-Rol.
 - 4. "Carlisle"; Miradri 860/861.

B. Self-Adhering Membrane:

- 1. SBS modified bitumen asphalt sheet membrane.
- 2. Self-adhesive surface on the back side with a removable film.
- 3. Face side to have a protective facer sheet film of polyester or polyethylene to provide the sheet membrane 100 percent protection against damage from UV radiation.
- 4. Rated for exterior use below-grade.
- 5. Need not be designed for permanent exterior exposure to the elements.
- 6. 40 mils minimum thickness.
- C. Miscellaneous Materials:
 - 1. Provide all primers, mastics, fasteners, sealers, sealants, tape and accessories as required for a fully complete system.
 - 2. All miscellaneous materials shall be as specified herein; all others to be as determined acceptable and applicable by the waterproofing system manufacturer.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until satisfactory conditions are corrected.
- B. Verify substrate surfaces are durable, free of matter detrimental to adhesion or application of membrane.
- C. Verify items which penetrate surfaces to receive membrane are securely installed.
- D. Report in writing to Architect prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
- E. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 PREPARATION OF SUBSTRATES

A. Refer to manufacturer's literature for requirements for preparation of substrates.

- B. Surfaces shall be structurally sound and free of voids, spalled areas, loose aggregate and sharp protrusions.
- C. Remove contaminates such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris.
- D. Use repair materials and methods which are acceptable to the manufacturer of the waterproofing system. Apply mastic to seal penetrations, small cracks or minor honeycomb in substrate.
- E. Clean and prepare surfaces to receive membrane in strict accordance with manufacturer's published instructions.

3.03 INSTALLATION

- A. Prime surfaces in accordance with manufacturer's published instructions.
- B. Install self-adhering sheet membrane to substrate surface, providing for full coverage of all areas and surfaces in strict accordance with manufacturer's published installation instructions.
- C. Seal all edges, seams, penetrations, joints and laps complete.
- D. Inspect waterproofing application and test for complete waterproofing ability as intended.

3.04 CLEANING AND PROTECTION

- A. Remove any masking materials after installation. Clean any stains or marks on materials exposed to view in the completed work.
- B. Backfill and cover installation per manufacturer's instructions and within recommended timeframe.
- C. Protect completed waterproofing from exposure to elements and from subsequent construction activities as recommended by the manufacturer.

SUBMITTAL CHECKLIST

- 1. Product Data.
- 2. Samples.

END OF SECTION 07130

SECTION 07200 - INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Extent of insulation work is indicated on the Drawings and specified herein.
- B. Applications of insulation specified in this section include the following:
 - 1. Foundation Wall Insulation.
 - 2. Board Cavity Wall Insulation.
 - 3. Batt/Blanket Thermal Insulation.
 - 4. Batt/Blanket Sound Insulation.
 - 5. Interior Vapor Retarder.

1.02 RELATED SECTIONS

Section 03300 - Cast-In-Place Concrete Section 04210 - Face Brick Masonry Section 04220 - Concrete Unit Masonry Section 04420 - Cut Stone Section 09251 - Gypsum Drywall - Wood Stud Construction

1.03 QUALITY ASSURANCE

A. Thermal Conductivity:

Thicknesses shown are for thermal conductivity (k-value at 75°F) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide appropriate thickness.

 B. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with governing regulations as interpreted by authorities.

1.04 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's specifications and installation instructions for each type of insulation required.
 - 2. Material Safety and Data Sheets (MSDS).

1.05 DELIVERY, STORAGE AND HANDLING

- A. Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.
- B. Protection for Plastic Insulation:
 - 1. Do not expose to sunlight.
 - 2. Protect against ignition at all times. Do not deliver plastic insulation materials to project site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each work area.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Foundation Wall Insulation (below grade application):
 - 1. Provide one of the following approved products:
 - a. "Dow Chemical Company", Styrofoam.
 - b. "Owens-Corning", Foamular.

- 2. Rigid, closed-cell, extruded polystyrene insulation board with integral high-density skin:
 - a. 25 psi minimum compressive strength.
 - b. K-value of 0.20.
 - c. 0.5% maximum water absorption.
 - d. Minimum value "R-5" per inch thickness, or as otherwise indicated on drawings.
 - e. Meeting all requirements of ASTM C578 Type IV.
- 3. Size:
 - a. Manufacturer's standard lengths and widths.
 - b. Thicknesses and R-Value as indicated on Drawings, or if not indicated, 2" thick, R-10.0 min.
- B. Board Cavity Wall Insulation (Above Grade Application):
 - 1. Provide one of the following approved products:
 - a. "Dow Chemical Company", Styrofoam.
 - b. "Owens-Corning", Foamular.
 - 2. Rigid, closed-cell, extruded polystyrene insulation board with integral high-density skin:
 - a. 25 psi minimum compressive strength.
 - b. K-value of 0.20.
 - c. 0.5% maximum water absorption.
 - d. Minimum value "R-5" per inch thickness, or as otherwise indicated on drawings.
 - e. Meeting all requirements of ASTM C578 Type IV.
 - 3. Size:
 - a. Manufacturer's standard lengths and widths.
 - b. Thicknesses and R-Value as indicated on Drawings, or if not indicated, 2" thick, R-10.0 min.
- C. Batt/Blanket Thermal Insulation (formaldehyde, acrylic and dye free):
 - 1. Unfaced Batts:
 - a. Provide accepted products from one of the following acceptable manufacturers:
 - 1.) "Owens Corning".
 - 2.) "USG".
 - 3.) "Johns Manville".
 - 4.) "CertainTeed".
 - b. Fiberglass Batts.
 - c. Continuous rolls in width of 16" or 24", as required to accommodate building component spacing.
 - d. Thickness to completely fill stud space and also provide R-value indicated on drawings. If not indicated, provide either 3-1/2" thick R-11 minimum or 6" thick R-19 minimum.
 - e. Provide unfaced batts for all batt/blanket thermal insulation, unless otherwise indicated.
 - 2. Kraft Faced Batts:
 - a. Use of Kraft Faced Batts is NOT permitted.
 - 3. Foil Faced Batts:
 - a. Provide accepted products from one of the following acceptable manufacturers:
 - 1.) "Owens Corning".
 - 2.) "USG".
 - 3.) "Johns Manville".
 - 4.) "CertainTeed".
 - b. Fiberglass Batts.
 - c. Continuous rolls in width of 16" or 24", as required to accommodate building component spacing.
 - d. Foil scrim vapor barrier facing, Class A rated, Type FSK-25.
 - e. Thickness to provide R-value indicated on drawings, or if not indicated, 3-1/2" thick, R-11.

- 4. Vinyl Faced Batts (for metal roof systems):
 - a. Provide accepted products from one of the following acceptable manufacturers:
 - 1.) "Owens Corning".
 - 2.) "USG".
 - 3.) "Johns Manville".
 - 4.) "CertainTeed".
 - b. Fiberglass Batts.
 - c. Continuous rolls in widths from 24" to 72", as required to accommodate joist or purlin spacing.
 - d. White, vinyl polyester facing, .02 perm rating, 0-25 flame spread rating and 0-450 smoke developed rating.
 - e Thickness to provide R-value indicated on drawings. Back fill with unfaced fiberglass blankets if required to meet indicated R-values.
- D. Batt/Blanket Sound Insulation (formaldehyde, acrylic and dye free):
 - 1. Fiberglass Batts.
 - a. Provide one of the following approved products:
 - 1). "Owens Corning" Sound Attenuation Batts Fiber Glass.
 - b. Unfaced.
 - c. Continuous rolls in width of 16" or 24", as required to accommodate building component spacing.
 - d. Thickness to completely fill stud space.
 At a minimum, provide 3-1/2" thickness to provide NRC value of 1.00 minimum.
 - e. Friction fit between studs at partition walls, or as indicated on the drawings.
 - 2. Mineral Wool Batts.
 - a. Provide one of the following approved products:
 - 1). "Owens Corning" Sound Attenuation Fire Batts (Mineral Wool).
 - 2). "Thermafiber" Safing Insulation.
 - b. Unfaced.
 - c. 48" lengths in width of 16" or 24", as required to accommodate building component spacing.
 - d. 3" thick minimum to provide NRC value of 1.05 minimum.
 - e. Friction fit between studs at rated partition walls, or as indicated on drawings.
- E. Interior Vapor Retarder:
 - 1. Provide one of the following approved products:
 - a. "Certainteed", MemBrain Smart Vapor Retarder.
 - 2. Vapor Permeance:
 - a. < 1.0 perm (ASTM E96, Dessicant Method)
 - b. > 10.0 perms (ASTM E96, Water Method)
 - 3. Fire Hazard (ASTM E 84)
 - a. Flame spread: 20 max.
 - b. Smoke Developed: 55 max.
 - 4. Fungi Resistance
 - a. No growth (ASTM C1338)
- F. Miscellaneous Materials:
 - 1. Adhesive for bonding insulating to be type recommended by insulation manufacturer and complying with fire-resistance requirements.
 - 2. Mechanical anchors to be type and size shown, or if not shown, as recommended by insulation manufacturer for type of application and condition of substrate.

PART 3 - EXECUTION

3.01 INSPECTION

A. Installer must examine substrate and conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do no proceed with insulation work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. General:
 - 1. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
 - 2. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation.
 - 3. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.
 - 4. For horizontal floor or roof applications, provide separate support system as required to hold insulation in its intended location. If not otherwise indicated, provide continuous single cables attached to bottom chord of trusses at 24" o.c. spacing to allow access to above insulation as desired. Chicken wire or other method of support shall be permitted as approved by the Architect.
- B. Perimeter Insulation:
 - 1. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type adhesive recommended by manufacturer of insulation.
 - 2. At interior side of foundation walls, extend insulation continuous from top of footing to bottom of slab.
 - 3. At exterior side of foundation walls, extend insulation from top of footing to grade line and cut top of insulation board along grade line as required.
- C. Cavity-Wall Insulation:
 - 1. On units of plastic insulation, install small pads of mastic spaced approximately 1'-0" o.c. both ways on inside face, as recommended by manufacturer.
 - 2. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways.
 - 3. Press units firmly against inside wythe of masonry or other construction as shown.

SUBMITTAL CHECK LIST

1. Product Data.

END OF SECTION 07200

SECTION 07240 - EXTERIOR INSULATION AND FINISH SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED

Furnish labor, materials, equipment, special tools, supervision and services required to install a complete exterior insulation and finish system (E.I.F.S.), as indicated, noted, detailed and scheduled on the Drawings and specified herein.

- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 07600 - Flashing, Sheet Metal and Roof Accessories Section 07900 - Joint Sealers Section 08410 - Aluminum Entrances and Storefronts Division 15 - Mechanical Vents, Grilles and Louvers Division 16 - Lighting Fixtures
- 1.03 QUALITY ASSURANCE
 - A. Exterior Insulation and Finish System shall be installed only be factory-trained and manufacture approved and licensed contractors familiar with the product and in strict accordance with the manufacturer's instructions.
 - B. All details relating to the installation by the approved contractor and/or by the manufacturer will furnish a 5 year Warranty for the installation.
 - C. All materials used shall be as furnished or approved by the E.I.F.S. manufacturer for use and compatibility with the entire E.I.F.S. system.
 - D. Manufacturer shall send a qualified technical representative to the project site for purpose of advising Installer of procedures and precautions related to use of E.I.F.S. materials.
 - E. UL Listing: Flamespread less than 25.

1.04 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's published specifications, installation instructions and general recommendations. 2. Include data substantiating that materials comply with specification requirements.
- B. Shop Drawings:
 - 1. Complete drawings, showing configuration, joint layout, connections, expansion joints and details.
- C. Samples:
 - 1. Samples of manufacturer's selection of colors for selection by Architect.
 - 2. Samples of manufacturer's entire selection of surface textures for selection by Architect.
 - 3. Submit 24 inch square sample of finished E.I.F.S. system, including gypsum board, insulation and all finish materials.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver packaged materials to site in manufacturer's original unopened, labeled, bundles or containers.
- B. Arrange deliveries to provide sufficient quantities to permit continuity of any phase of work.
- C. Do not store material on floor or roof construction in concentrations large enough to impose excessive stress on decking or structural members.
- D. Materials shall be stacked and protected from moisture penetration and freezing.

1.06 JOB CONDITIONS

Proceed with E.I.F.S. installation when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer=s recommendations and warranty requirements.

1.07 <u>SPECIAL PROJECT WARRANTY</u> Provide written warranty, signed by manufacturer of primary E.I.F.S. for materials and workmanship for a period of 5 years after date of Final Acceptance.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER'S

- A. Primary E.I.F.S. System Materials:
 - 1. "Dryvit Systems, Inc."
 - 2. "STO Corporation"
 - 3. "BASF/Senergy"

2.02 MATERIALS

A. All components shall be obtained from or approved by the primary E. I. F.S. manufacturer.

- B. Gypsum Board Sheathing Substrate (Non-Fire Rated Assemblies):
 - 1. Provide one of the following approved products:
 - a. "Georgia-Pacific", "Dens-Glass Gold Sheathing".
 - 2. Manufacture to meet specifications for ASTM D 3273.
 - 3. Provide in maximum lengths available to minimize end-to-end butt joints.
 - 4. Fiber glass mats over moisture-resistant gypsum core. Paperless facings.
 - 5. Thickness:
 - a. Framing at 16 inches o.c.: 1/2 inch, or as otherwise indicated on the Drawings.
 - 6. Width: 4 feet.
 - 7. Length: 8 feet minimum.
 - 8. Edges: Square.
- C. Sheathing Fasteners:
 - 1. Corrosion-resistant, self-drilling, self-tapping type.
 - 2. Spacing:
 - a. 8 inches o.c. along edge of sheathing at joint.
 - b. 12 inches o.c. in field area of sheathing.
- D. Insulation Board:
 - 1. Molded polystyrene boards as approved by E.I.F.S. manufacturer.
 - 2. Density: 1.0 pcf.
 - 3. Size: 2 feet x 4 feet maximum; 1 inch thick minimum.
 - 4. Flamespread: 25 maximum when tested per ASTM E-84.

- 5. Smoke Development: 450 maximum when tested per ASTM E-84.
- 6. Thermal Value: "k" per inch.
 - a. .23 BTU/°F/SF at 40°F
 - b. .23 BTU/°F/SF at 74°F
- E. Insulation Board Adhesive:
 - 1. Acrylic polymer-modified base coat material mixed with Portland cement.
 - 2. Ready-mixed or field-mixed.
- F. Impact-Resistant Reinforcing Mesh:
 - 1. Treated, open weave, glass fiber type.
 - 2. Acceptable products:
 - a. "Dryvit", "Panzer 20".
 - b. "STO", "Armour Mat XX".
 - 3. 20 ounce.
 - 4. Provide and install a layer of impact-resistant reinforcement mesh below a layer of manufacturer's standard reinforcing mesh.
- G. Finish:
 - 1. Factory-mixed, 100% pure acrylic base.
 - 2. Integral color and texture.
 - 3. Color and texture to be selected from manufacturer's entire selection.
- H. Water:
 - 1. Clean, potable and free and all foreign matter.
- I. Sealant:
 - 1. Refer to Section 07900-Joint Sealers.

2.03 MIXING AND PREPARATION

- A. Adhesive:
 - 1. No mixing required. Water should not be added.
- B. Finish:
 - 1. Thoroughly stirred until a uniform workable consistency is obtained.
 - 2. Small amount of water may be added to adjust workability.
 - 3. No additive, or materials of any kind, such as rapid binders, antifreeze, accelerators, filters, pigments, etc. shall be added under any circumstances.
 - 4. Use finish material immediately after mixing. Container to be kept closed when not in use.
- C. Reinforcing Mesh:
 - 1. Reverse roll to remove curling tendencies.

PART 3 - EXECUTION

- 3.01 INSPECTION
 - A. Examination of Substrate:
 - 1. Prior to installation of the E.I.F.S., the Substrate shall be examined by the Applicator as follows: a. The Substrate shall be a type approved by E.I.F.S.
 - b. The Substrate surface shall be free of foreign materials such as oil, dust, dirt, form-release agents, paint, wax, glazing, water, moisture, frost, etc.
 - c. The Substrate shall be examined for compliance with Contract Documents.

- d. The Substrate shall be examined for soundness, such as tightness of connections, crumbling or looseness of surface, voids and projections, etc.
- e. The Substrate shall be examined for dimensional correctness.
- 2. The Architect and Contractor shall be advised of all discrepancies. Work shall not proceed until unsatisfactory conditions are corrected.

3.02 INSULATION BOARD INSTALLATION

- A. Apply insulation boards to substrate beginning from the bottom with joints offset to produce a running bond pattern.
- B. Precut board to fit openings, corners, projections, etc.
- C. Apply adhesive directly to one surface of the insulation board using a notched trowel over entire board surface.
- D. Apply a 2 inch wide x 3/8 inch thick ribbon of adhesive around entire perimeter of board.
- E. Install board immediately after application of adhesive. Slide into final position, tight against adjacent boards.
- F. Tamp entire area of board to ensure complete contact of adhesive.
- G. Allow 24 hours minimum for adhesive to form a positive bond.

3.03 DESIGNS AND SHAPES

- A. Grooves and other features are to be routed into the outside surface of the insulation board. The minimum thickness of the board at any point in the routed groove or feature must not be less than 3/4 inch.
- B. Apply foam shapes of insulation board directly to the substrate or surface of the insulation board.
- C. Follow the E.I.F.S. manufacturer's detailed instructions for these procedures.
- D. All soffits to have routed "drip" reveals, continuous at perimeter.

3.04 BASE COAT

- A. Inspect the surface of insulation board for flatness. High areas out-of-plane are to be sanded flat.
- B. Repair any damaged board surfaces and remove foreign materials.
- C. Apply a 1/16 inch uniform layer of adhesive mixture to the surface of insulation board.
- D. Embed reinforcing mesh into adhesive as follows:1. Impact-resistant mesh.
- E. Smooth out the adhesive mixture with a trowel until mesh is fully embedded. Mesh pattern should not be visible.
- F. Allow 24 hours minimum for base coat to form a positive bond.
- G. Protect the base coat from damage and weather while curing.

3.05 FINISH COAT

- A. Apply the finish continuously and in one operation to the entire wall surface. Maintain a wet edge at all times.
- B. The installer is responsible for providing sufficient manpower, scaffolding and equipment to ensure a continuous operation and uniform appearance.
- C. Work shall proceed toward joints and corners.
- D. Apply the finish in a tight coat to the base coat. Leveling and texturing are to be one operation.
- E. The maximum thickness of finish coat should not be greater than of the largest aggregate.

3.06 FIELD QUALITY CONTROL

A. An authorized representative of the E.I.F.S. must visit the project site during construction to inspect the means, methods and materials being used for the entire E.I.F.S.

3.07 CLEAN-UP

- A. All excess materials, scraps, debris, etc. are to be removed from the project site upon completion.
- B. Clean all adjacent surfaces and materials and the work area in general of foreign materials resulting from their work.

SUBMITTAL CHECK LIST

- 1. Product Data.
- 2. Shop Drawings.
- 3. Samples.

END OF SECTION 07240

SECTION 07250 - WEATHER BARRIERS

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Weather Barrier Membrane / Air Infiltration Barrier.
- B. Seam Tape.
- C. Flashing.
- D. Fastener.

1.02 <u>REFERENCES</u>

- A. ASTM International
 - 1. ASTM C920; Standard Specification for Elastomeric Joint Sealants
 - 2. ASTM C1193; Standard Guide for Use of Joint Sealants
 - 3. ASTM D882; Test Method for Tensile Properties of Thin Plastic Sheeting
 - 4. ASTM D1117; Standard Guide for Evaluating Non-woven Fabrics
 - 5. ASTM E84; Test Method for Surface Burning Characteristics of Building Materials
 - 6. ASTM E96; Test Method for Water Vapor Transmission of Materials
 - 7. ASTM E1677; Specification for Air Retarder Material or System for Framed Building Walls
 - 8. ASTM E2178; Test Method for Air Permeance of Building Materials
 - 9. ASTM E2357; Standard Test Method for Determining Air Leakage of Air Barrier Assemblies
- B. AATCC American Association of Textile Chemists and Colorists
 - 1. Test Method 127 Water Resistance: Hydrostatic Pressure Test

C. TAPPI

- 1. Test Method T-410; Grams of Paper and Paperboard (Weight per Unit Area)
- 2. Test Method T-460; Air Resistance (Gurley Hill Method)

1.03 SUBMITTALS

A. Refer to Section 01330-Submittal Procedures

- B. Product Data: Submit manufacturer current technical literature for each component.
- C. Samples: Weather Barrier Membrane, minimum 8-1/2 inches by 11 inch.
- D. Quality Assurance Submittals
 - 1. Design Data, Test Reports: Provide manufacturer test reports indicating product compliance with indicated requirements.
 - 2. Manufacturer Instructions: Provide manufacturer's written installation instructions.
 - 3. Manufacturer's Field Service Reports: Provide site reports from authorized field service representative, indicating observation of weather barrier assembly installation.
- E. Closeout Submittals
 - 1. Refer to Section 01780 Closeout Submittals.
 - 2. Weather Barrier Warranty: Manufacturer's executed warranty form with authorized signatures and endorsements indicating date of Substantial Completion.

1.04 QUALITY ASSURANCE

- A. Qualifications
 - 1. Installer shall have experience with installation of weather barrier assemblies under similar conditions.
 - 2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
 - 3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.
- B. Mock-up
 - 1. Install mock-up using approved weather barrier assembly including fasteners, flashing, tape and related accessories per manufacturer's current printed instructions and recommendations.
 - a. Mock-up size: 10 feet by 10 feet
 - b. Mock-up Substrate: Match wall assembly construction, including window opening.
 - c. Mock-up may remain as part of the work if approved by Architect.
 - d. Re-work and re-construct mock-up as necessary to meet Architect approval.
 - 2. Contact manufacturer's designated representative prior to weather barrier assembly installation, to perform required mock-up visual inspection and analysis as required for warranty.
- C. Pre-installation Meeting
 - 1. Refer to Section 01300 Project Meetings.
 - 2. Hold a pre-installation conference, two weeks prior to start of weather barrier installation. Attendees shall include Contractor, Architect, Construction Manager, Installer, Owner's Representative, and Weather Barrier Manufacturer's Designated Representative.
 - 3. Review all related project requirements and submittals, status of substrate work and preparation, areas of potential conflict and interface, availability of weather barrier assembly materials and components, installer's training requirements, equipment, facilities and scaffolding, and coordinate methods, procedures and sequencing requirements for full and proper installation, integration and protection.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section 01610 Product Storage and Handling.
- B. Deliver weather barrier materials and components in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Store weather barrier materials as recommended by weather barrier manufacturer.
- D. Provide tarps as required. Manufacturer's shrink wrap alone is not sufficient protection.

1.06 <u>SCHEDULING</u>

- A. Review requirements for sequencing of installation of weather barrier assembly with installation of windows, doors, louvers and flashings to provide a weather-tight barrier assembly.
- B. Schedule installation of exterior cladding such that weather barrier is not directly exposed to elements for more than 60 days. Where cladding is delayed, provide inspection and repair of exposed weather barrier as required.

- B. Special Warranty
 - 1. Special weather-barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of final weather barrier installation.
 - 2. Pre-installation meetings and jobsite observations by weather barrier manufacturer for warranty is required prior to assembly installation.
 - 3. Warranty Areas: Entire building.

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. DuPont; 4417 Lancaster Pike, Chestnut Run Plaza 728, Wilmington, DE 19805; 1-800-44-TYVEK (8-9835); http://www.construction.tyvek.com

2.02 <u>MATERIALS</u>

Basis of Design: spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont[™] Tyvek[®] CommercialWrap[®] and related assembly components.

Performance Characteristics:

- 1. Air Penetration: 0.001 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2178. Type I per ASTM E1677. ≤0.04 cfm/ft2 at 75 Pa, when tested in accordance with ASTM E2357.
- 2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E96, Method B.
- 3. Water Penetration Resistance: Minimum 280 cm when tested in accordance with AATCC Test Method 127.
- 4. Basis Weight: Minimum 2.7 oz/yd2, when tested in accordance with TAPPI Test Method T-410.
- 5. Air Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.
- 6. Tensile Strength: Minimum 38/35 lbs/in., when tested in accordance with ASTM D882, Method A.
- 7. Tear Resistance: 12/10 lbs., when tested in accordance with ASTM D1117.
- 8. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E84. Flame Spread: 10, Smoke Developed: 10.

2.02 ACCESSORIES

- A. Seam Tape: As recommended by the weather barrier manufacturer.
- B. Fasteners. Provide the following as required for each type of construction:
 - Steel Frame Construction: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap or manufacturer approved 1-1/4" or 2" metal gasketed washer
 - Wood Frame Construction: Nail Caps: #4 nails with large 1-inch plastic cap fasteners, or 1-inch plastic cap staples with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud.
 - 3. Masonry Construction:

Masonry tap-con fasteners with Caps: 2-inch diameter plastic cap fasteners.

- C. Sealants
 - 1. Provide sealants that comply with ASTM C920, elastomeric polymer sealant to maintain watertight conditions.
 - 2. Products: Sealants recommended by the weather barrier manufacturer.

D. Adhesives:

- 1. Provide adhesive recommended by weather barrier manufacturer.
- 2. Products: Adhesives recommend by the weather barrier manufacturer.
- E. Primers:
 - 1. Provide flashing manufacturer recommended primer to assist in adhesion between substrate and flashing.
 - 2. Products: Primers recommended by the flashing manufacturer.
- F. Flashing
 - 1. Flexible membrane flashing materials for window openings and penetrations recommended by manufacturer.
 - 2. Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc. recommended by manufacturer.
 - 3. Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
 - 4. Preformed Inside and Outside Corners and End Dams: Preformed three-dimensional shapes to complete the flashing system used in conjunction with Thru-Wall Flashing.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify substrate and surface conditions are in accordance with weather barrier manufacturer recommended tolerances prior to installation of weather barrier and accessories.

3.02 INSTALLATION – WEATHER BARRIER

- A. Install weather barrier over exterior face of exterior wall substrate in accordance with manufacturer recommendations.
- B. Install weather barrier prior to installation of windows and doors.
- C. Start weather barrier installation at a building corner, leaving 6-12 inches of weather barrier extended beyond corner to overlap.
- D. Install weather barrier in a horizontal manner starting at the lower portion of the wall surface with subsequent layers installed in a shingling manner to overlap lower layers. Maintain weather barrier plumb and level.
- E. Sill Plate Interface: Extend lower edge of weather barrier over sill plate interface 3-6 inches. Secure to foundation with elastomeric sealant as recommended by weather barrier manufacturer.
- F. Window and Door Openings: Extend weather barrier completely over openings.
- G. Overlap weather barrier
 - 1. Exterior corners: minimum 12 inches.
 - 2. Seams: minimum 6 inches.

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- H. Weather Barrier Attachment. Provide the following as required for each type of construction::
 - 1. Wood Frame Construction: Attach weather barrier to studs through exterior sheathing. Secure using weather barrier manufacturer recommend fasteners, space 12-18 inches vertically on center along stud line, and 24 inch on center, maximum horizontally.
 - 2. Masonry Construction: Attach weather barrier to masonry. Secure using weather barrier manufacturer recommend fasteners, space 12-18 inches vertically on center and 24 inches maximum horizontally. Weather barrier may be temporarily attached to masonry using recommended adhesive, placed in vertical strips spaced 24 inches on center, when coordinated on the project site.
- I. Apply flashing to weather barrier membrane prior to installing cladding anchors.

3.03 SEAMING

- A. Seal seams of weather barrier with seam tape at all vertical and horizontal overlapping seams.
- B. Seal any tears or cuts as recommended by weather barrier manufacturer.
- C. Where furring for cladding or other construction is installed over the weather barrier, all fasteners through the weather barrier are to be applied over 12" long pieces of seam tape, or installed as otherwise required by manufacturer to maintain warranty.
- 3.04 OPENING PREPARATION (for use with non-flanged windows all cladding types)
 A. Flush cut weather barrier at edge of sheathing around full perimeter of opening.
 - B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.
- 3.05 <u>FLASHING (for use with non-flanged windows all cladding types)</u>
 - A. Cut flexible flashing a minimum of 12 inches longer than width of sill rough opening.
 - B. Cover horizontal sill by aligning flexible flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
 - C. Fan flexible flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges.
 - D. Apply 9-inch wide strips of flashing at jambs. Align flashing with interior edge of jamb framing. Start flashing at head of opening and lap sill flashing down to the sill.
 - E. Spray-apply primer to top 6 inches of jambs and exposed sheathing.
 - F. Install flexible flashing at opening head using same installation procedures used at sill. Overlap jamb flashing a minimum of 2 inches.
 - G. Coordinate flashing with window installation.
 - H. On exterior, install backer-rod in joint between window frame and flashed rough framing. Apply sealant at jambs and head, leaving sill unsealed. Apply sealants in accordance with sealant manufacturer's instructions and ASTM C1193.

- I. Position weather barrier head flap across head flashing. Adhere using flashing over the 45degree seams.
- J. Tape top of window in accordance with manufacturer recommendations.
- K. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply closed cell spray foam sealant around entire window perimeter and at all field mulled joints to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C1193.
- 3.06 <u>OPENING PREPARATION</u> (for use with flanged windows)
 - A. Cut weather barrier in an "I-cut" or modified "I-cut" pattern as recommended by window manufacturer. "X-cut" patterns are not acceptable.
 - 1. Cut weather barrier horizontally along the bottom and top of the window opening.
 - 2. From the top center of the window opening, cut weather barrier vertically down to the sill..
 - 3. Fold side and bottom weather barrier flaps into window opening and fasten.
 - B. Cut a head flap at 45-degree angle in the weather barrier at window head to expose 8 inches of sheathing. Temporarily secure weather barrier flap away from sheathing with tape.
- 3.07 <u>FLASHING (for use with flanged windows)</u>
 - A. Cut flexible flashing a minimum of 12 inches longer than width of sill rough opening.
 - B. Cover horizontal sill by aligning flexible flashing edge with inside edge of sill. Adhere to rough opening across sill and up jambs a minimum of 6 inches. Secure flashing tightly into corners by working in along the sill before adhering up the jambs.
 - C. Fan flexible flashing at bottom corners onto face of wall. Firmly press in place. Mechanically fasten fanned edges if necessary.
 - D. On exterior, apply continuous bead of sealant to wall or backside of window mounting flange across jambs and head. Do not apply sealant across sill.
 - E. Install window according to manufacturer's instructions.
 - F. Apply strips of flashing at jambs overlapping entire mounting flange. Extend jamb flashing 1inch above top of rough opening and below bottom edge of sill flashing.
 - G. Apply strip of flashing as head flashing overlapping the mounting flange. Head flashing should extend beyond outside edges of both jamb flashings.
 - H. Position weather barrier head flap across head flashing. Adhere flashing over the 45-degree seams.
 - I. Tape head flap in accordance with manufacturer recommendations.
 - J. On interior, install backer rod in joint between frame of window and flashed rough framing. Apply closed cell spray foam sealant around entire window perimeter and at all field mulled joints to create air seal. Apply sealant in accordance with sealant manufacturer's instructions and ASTM C 1193.

3.08 THRU-WALL FLASHING INSTALLATION

- A. Apply primer per manufacturer's written instructions.
- B. Install preformed corners and end dams bedded in sealant in appropriate locations along wall.
- C. Starting at a corner, remove release sheet and apply membrane to primed surfaces in lengths of 8 to 10 feet.
- D. Extend membrane through wall and leave 1/4 inch minimum exposed to form drip edge.
- E. Roll flashing into place. Ensure continuous and direct contact with substrate.
- F. Lap ends and overlap preformed corners 4 inches minimum. Seal all laps with sealant. (Specifier Note: DELETE paragraph below if a metal drip edge is not required.)
- G. Trim exterior edge of membrane 1-inch and secure metal drip edge per manufacturer's written instructions.
 (Specifier Note: DELETE option below when not required for project.)
- H. Terminate membrane on vertical wall. [Terminate into reglet, counterflashing or with termination bar.]
- I. Apply sealant bead at each termination.
- 3.09 <u>THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT BASE OF WALL</u> A. Overlap thru-wall flashing with weather barrier by 6-inches.
 - B. Mechanically fasten bottom of weather barrier through top of thru-wall flashing.
 - C. Seal vertical and horizontal seams with tape or sealing membrane.
- 3.10 THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT SHELF ANGLE
 - A. Seal weather barrier to bottom of shelf angle with sealing membrane.
 - B. Apply thru-wall flashing to top of shelf angle. Overlap thru-wall flashing with weather barrier by 6-inches.
 - C. Seal bottom of weather barrier to thru-wall flashing with tape or sealing membrane.

3.11 <u>THRU-WALL FLASHING / WEATHER BARRIER INTERFACE AT WINDOW HEAD</u> A. Cut flap in weather barrier at window head.

- B. Prime exposed sheathing.
- C. Install lintel as required. Verify end dams extend 4 inches minimum beyond opening.
- D. Install end dams bedded in sealant.
- E. Adhere 2 inches minimum thru-wall flashing to wall sheathing. Overlap lintel with thru-wall flashing and extend ¼ inch minimum beyond outside edge of lintel to form drip edge.

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- F. Apply sealant along thru-wall flashing edges.
- G. Fold weather barrier flap back into place and tape bottom edge to thru-wall flashing.
- H. Tape diagonal cuts of weather barrier.
- I. Secure weather barrier flap with fasteners.

3.08 FIELD QUALITY CONTROL

A. Notify manufacturer's designated representative to obtain required periodic observations of weather barrier assembly installation.

3.09 PROTECTION

- A. Protect installed weather barrier from damage.
- B. Repair any portions of weather barrier damaged by exposure to elements. If underlying construction is damaged from exposure to elements, repair or replace. If any material which can support growth of mold is damaged by exposure to elements, material must be removed.

END OF SECTION 07250

SECTION 07531 - ELASTOMERIC SHEET ROOFING SYSTEM - FULLY ADHERED (EPDM)

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the Work indicated, noted and detailed on the Drawings and specified herein.
 - B. The Work generally involves a new single-ply E.P.D.M. (Ethylene Propylene Diene Monomer) membrane roofing system. In general, and not by way of limitation, work includes, but is not limited to, the following:
 - 1. E.P.D.M. system at low slope roofs:
 - a. Insulation (extruded polystyrene flute fillers and polyisocyanurate insulation boards) mechanically fastened to the deck, with tapered insulation saddles mechanically fastened to the deck.
 - b. Overlayment board ("Georgia Pacific", "Dens Deck"), atop the insulation, mechanically fastened to the deck. Joints of overlayment staggered with insulation joints.
 - c. The membrane sheet is fully adhered to the overlayment board, and the seams are glued, lapped and sealed.
 - d. Work includes the installation of new insulation, saddles, sumps, blocking, roof membrane, fasteners, adhesives, copings, flashings, walkpads, sealants, and any/all additional items, components and accessories necessary to complete the work as indicated and meet the manufacturer's warranty requirements for a complete system warranty.
 - C. The words "ply", "membrane", and "sheet" are used interchangeably, and are to be interpreted as having the same meaning.
 - D. Work includes the following special warranties, as specified:
 - 1. Water-tightness warranty from the installer.
 - 2. Warranty from the manufacturer for water-tightness.
 - E. Not all details and conditions are shown on the Drawings. Contractor is responsible for providing a complete, finished, and water-tight roof system, warranted for water tightness from the deck up.
 - F. System requirements or details as indicated on the Drawings or specified herein may exceed the manufacturer's minimum warranty requirements. Provide as indicated, above and beyond the minimum warranty requirements. Notify the Architect during bidding if any conflicts exist between that as indicated and the manufacturer's warranty requirements.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Related Documents:
 - 1. The Contract Documents, as defined in the Summary of Work, apply to the Work of this Section.
 - 2. Additional requirements and information necessary to complete the Work of this Section may be found in other documents.
- B. Related Sections:
 - 1. Section 06100 Rough Carpentry
 - 2. Section 07600 Flashing, Sheet Metal and Roof Accessories
 - 3. Section 07900 Joint Sealers
 - 4. Division 15 Mechanical and Plumbing Work
 - 5. Division 16 Electrical Work

1.03 QUALITY ASSURANCE

- A. Elastomeric sheet roofing and flashing shall be installed only by factory-trained and manufacturer approved and licensed roofing contractors familiar with the product and in strict accordance with the manufacturer's instructions.
- B. All details relating to the installation of the approved roofing contractor and/or by the manufacturer shall be installed in such a manner that the manufacturer will furnish the specified Warranty for the installation.
- C. All materials used shall be as furnished or approved by the roofing manufacturer for use and compatibility with the entire roofing system.
- D. Manufacturer shall send a qualified technical representative to project site for purpose of advising Installer of procedures and precautions related to use of roofing materials.
- E. UL Listing: Provide labeled materials that have been tested and listed UL for application indicated to provide a "Class A" rated materials/system.
- F. Factory Mutual Listing: provide flexible sheet roofing system which is listed as approved in the FM Approval Guide and complies with the following FM classifications:
 - 1. "Class 1" fire rating.
 - 2. "Classification I-90" wind uplift rating on FM Loss Prevention Data Sheets 1-28 and 1-29, for 90 mph 3-second gust, Exposure Category C.
- G. Conduct fastener pullout tests in accordance with the latest revision of the SPRI/ANSI Fastener Pullout Standard to help verify condition of deck/substrate and to confirm expected pullout values.

1.04 <u>REFERENCES</u>

- A. Publications of the following institutes, associations, societies and agencies are referred to in this Section.
 - 1. American Society for Testing and Materials (ASTM):
 - a. C 208 Specification for Cellulosic Fiber Insulating Board.
 - b. C 1177 Standard Specification for Glass Mat Gypsum Roof Board.
 - c. C 1289 Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - d. D 412 Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
 - e. D 471 Test Method for Rubber Property-Effect of Liquids.
 - f. D 573 Test Method for Rubber-Deterioration in an Air Oven.
 - g. D 624 Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
 - h. D 1149 Test Method for Rubber Deterioration-Surface Ozone Cracking in a Chamber.
 - i. D 1822 Test Method for Tensile-Impact Energy To Break Plastics and Electrical Insulating Materials.
 - j. D 2137 Test Methods for Rubber Property-Brittleness Point of Flexible Polymers and Coated Fabrics.
 - k. D 5602 Test Method for Static Puncture Resistance of Roofing Membrane Samples.
 - I. D 5635 Test Method for Dynamic Puncture Resistance of Roofing Membrane Samples.
 - m. E 84 Test Method for Surface Burning Characteristics of Building Materials.
 - n. E 96 Test Methods for Water Vapor Transmission of Materials.
 - o. E 108 Test Methods for Fire Tests of Roof Coverings.

- p. G 26 Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of Nonmetallic Materials.
- q. G 53 Practice for Operating Light and Water Exposure Apparatus (Fluorescent UV/Condensation Type) for Exposure of Nonmetallic Materials.
- r. G 155 Practice for Operating Light Exposure Apparatus (Xenon-arc Type) With and Without Water for Exposure of Non-Metallic Materials.
- s. G 154 Practice for Operating Light and Water-Exposure Apparatus (Fluorescent UV Condensation Type) for Exposure of Nonmetallic Materials.
- 2. Underwriter's Laboratories, Inc. (UL) Class rating per applicable State Building Code.
- 3. Factory Mutual Underwriters (FM):
 - a. Factory Mutual Research Corporation-Loss Prevention Data Sheets: 1-7; 1-28; 1-28(s); 1-29; 1-30; 1-49.
 - b. Factory Mutual Research Corporation (FMRC) Approval Guide Roof Coverings.
- c. Factory Mutual Research Corporation Standard 4470 Approval Standard for Class I Roof.
- 4. National Roofing Contractors Association (NRCA) NRCA Roofing and Waterproofing Manual.
- 5. Roof Consultants Institute (RCI) Glossary of Terms.
- 6. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) Architectural Sheet Metal Manual.
- 7. American Society of Civil Engineers (ASCE) Reference Documents ASCE 7-98, Minimum Design loads for Buildings and Other Structures.

1.05 CODE AND TEST REQUIREMENTS

- A. The roof system that is bid shall have been tested in compliance with the following codes and test requirements.
 - 1. The roof system assembly shall have test data in compliance with test criteria set forth in Factory Mutual Test Standard 4470 to support uplift pressure resistance to design pressures calculated in compliance with ASCE 7-98.
 - 2. The roof system assembly shall be approved for application within the International Building Code jurisdiction.
 - 3. The roof system assembly shall be installed in compliance with all local building and safety requirements adopted by the local building code jurisdiction.
 - 4. All metal flashings shall be in compliance with recommendations set forth in Factory Mutual Research Corporation Loss Prevention Sheet 1-49.

1.06 SUBMITTALS

- A. Submit the following in compliance with contract conditions and Division 1 Specification Sections.
 - 1. Compliance Confirmation:
 - a. Confirmation of Manufacturer and Applicator/Contractor/Installer requirements enumerated in this Section and as indicated on the Drawings.
 - 2. Samples:
 - a. 12" x 12" square sample of each type of membrane, including a finished "T-shaped" side/end-lap seam.
 - b. 12" x 12" square sample of all roof insulation types and overlayment used.
 - c. Flashing materials.
 - d. All fastener types used.
 - 3. Product Data:
 - a. Manufacturer's current published installation instructions, flashing and roofing specifications, Product Data Sheets for all products, and Material Safety Data Sheets for all products used in the assembly of the roof system.
 - b. Manufacturer's complete recommended maintenance procedures for roofing system, including precautions and warnings to prevent damage to, and deterioration of roofing system, and any safety precautions published by the roof system manufacturer.

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- 4. Shop Drawings:
 - a. Provide complete installation details of roofing, flashing, fastening and insulation, including notation of roof slopes and fastening patterns of insulation and membrane. Shop drawings to include (but not limited to):
 - 1) Outline of roof with roof size and elevations shown.
 - 2) Profile details of flashing methods for all conditions and penetrations.
 - 3) Technical acceptance from roof membrane manufacturer.
 - 4) Insulation fastener layouts complying with FM Data Sheet 1-29. Indicate number of fasteners required for field, perimeter and corners.
 - Setting plan for insulation including all tapered, saddles and crickets.
 - Layout of roofing seams, direction of laps.
- 5. Certificates:
 - a. Manufacturer's written approval of:
 - 1) The roof system to be applied over the submitted insulation and deck type.
 - 2) The coping system.
 - 2) The Contract Documents.
 - 3) The Applicator/Contractor/Installer.
 - Warranty conditions specified. Submit certification letter acknowledging receipt of the specifications, intent to issue warranty, and intent to perform specified field inspections.
 - b. Insulation manufacturer's certification that the product is compatible with the proposed roof system and meets specification requirements.
 - c. Manufacturer's field reports from field inspections.
 - Submit the following reports directly to the Architect:
 - 1) Preparatory Inspection.
 - 2) Initial Inspection.
 - 3) Follow-up Inspections.
 - 4) Final Inspection.
 - d. At completion of roof application, the contractor and membrane manufacturer shall supply the Owner and/or Architect with a complete set of as-built drawings.
 - e. Certification from the membrane manufacturer at job completion confirming the installed roof assembly is in compliance with the approved submittals.

1.07 QUALIFICATIONS

- A. Applicator's Qualifications:
 - 1. All roofing contractors/installers must be pre-qualified to bid, by both the manufacturer and the Architect, at least seven days prior to the bid date.
 - 2. For purposes of quality assurance and performance with specified roof system installation, all bidders are to be approved by the manufacturer, and listed as approved by the Architect, prior to the bid date and throughout the installation, and able to present a copy of current certification status upon request by the Architect or Owner.
 - 3. Contractor must have experience in installing the specified roof system and be able to produce a list of referenced projects to visit.
 - 4. Maintain a full-time supervisor/foreman experienced with the specified roof system on-site when roof system application is in progress. Certification of general experience and experience with specified roof system shall be included in the submittal.
 - 5. Be equipped with a trained crew and all capital equipment required to perform work of this section.
 - a. Maintain all equipment and tools in good working order.
 - b. Provide, in writing, safety plan and equipment to the work force and specify, proper clothing.
 - 6. Contractors not already pre-qualified in this Specification, and wishing approval to be qualified to bid, shall submit qualifications and certifications in writing to the Architect for written approval prior to bid.

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B. **Pre-Qualified Installers:**

- 1. American Roofing 4610 Roofing Rd.; Louisville, KY 40218 (502) 966-2900; (502) 966-2970 fax
- Bruce's Tri-State Roofing & Sheet Metal Co. 320 East 14th Street; Owensboro, KY 42303 (270) 683-0610; (270) 683-3508 fax
- Carlon Roofing & Sheet Metal, Inc. 1430 Selinda Avenue; Louisville, KY 40213 (502) 458-9898; (502) 458-9068 fax
- Commonwealth Roofing 1449 Hugh Avenue, Louisville, KY 40213-1916 (502) 459-2216
- D. Riney Roofing, LLC 2203 Stannye Drive; Louisville, KY 40222 (502) 544-6202
- Geoghegan Roofing Corporation 1405 Garland Avenue; Louisville, KY 40210 (502) 585-4313; (502) 585-5494 fax
- Hedinger Roofing 2803 Market Street; Jasper, IN 47546 (812) 482-5066; (812) 634-2123 fax
- Holland Roofing Company 3600 Chamberlain Lane; Louisville, KY 40241 (502) 426-7767; (502) 426-7787 fax
- Insulated Roofing Contractors 326 Mt. Tabor Road; New Albany, IN 47150 (812) 206-7700; (812) 206-7701 fax
- 10. **Palmer Roofing and Sheet Metal, Inc.** 1080 Jean Drive; Jeffersonville, IN 47130 (812) 283-4800; (812) 283-4900 fax
- 11. **Roofing Services and Solutions, LLC (RSS)** 1508 Fabricon Boulevard; Jeffersonville, IN 47130 (812) 283-4490; (812) 283-6412 fax
- 12. Royalty Companies 1000 D Avenue; Seymour, IN 47274 (812) 523-8392
- 13. Southern Roofing, Inc. 770 Jonesville Road; Columbus, IN 47201 (812) 375-1888; (812) 375-1850 fax
- 14. South Central Roofing, Inc. 1650 N State Rd 46; Columbus, IN 47203 (812) 579-5733; (812) 579-5739 fax
- C. Manufacturer's Qualifications:
 - 1. Must have a minimum of 20-year experience manufacturing elastomeric roofing membranes.
 - 2. Provide a factory-trained technician to attend site meetings, interim inspections, and to perform final inspections of the roofing system.
 - 3. Provide a warranty upon satisfactory installation of the roofing system.

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1.08 PRE-INSTALLATION CONFERENCE

- A. Convene less than five days prior to commencing work of this section at the jobsite, and at a time to be determined by the architect, contractor, manufacturer's field representative, and the owner.
 - 1. All parties responsible for work of this section are required to attend including the Architect, Contractor and any other trades involved in the roofing work.
 - 2. Review installation procedures and coordination required with related work.
 - a. Tour, inspect and discuss condition of substrate, gutters and downspouts final locations, curbs, penetrations and other preparatory work performed by other trades.
 - b. Review structural loading limitations of deck and inspect deck for loss of flatness and for required mechanical fastening.
 - c. Review roofing system requirements (Drawings, Specifications, Submittals and any other Contract Documents.)
 - d. Review required submittals, both completed and yet to be completed.
 - e. Review and finalize construction schedule related to roofing work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
 - f. Review requirements for Manufacturer's Roofing Quality Control Inspector inspections, other inspections, testing, certifying, and material usage accounting procedures.
 - g. Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing.
 - 3. Inspect and make notes of job conditions prior to installation.
 - a. Minutes shall be taken at the conference and provided to all parties present.
 - b. All outstanding issues shall be noted in writing designating the responsible party for followup action and the timetable for completion.
 - c. Application of roofing system will not take place until all outstanding issues are completed.
 - d. Acceptable staging areas; suitable parking and access points; placement of trash conveyances; sanitary requirements; and all working hour restrictions (day/night, weekends, holidays); noise restrictions and project complaint procedure between contractor and building owner (occupants).
 - 4. If conditions are not satisfactory, and an additional conference is required, Contractor shall bear the transportation expenses for all parties to attend second conference.

1.09 DELIVERY, STORAGE AND HANDLING

A. Arrange deliveries to provide sufficient quantities to permit continuity of any phase of work.

- B. Do not store material on roof construction in concentrations large enough to impose excessive stress on decking or structural members. No stockpiling of materials on the roofs will be permitted. Materials will be raised onto roof in limited quantities only as needed for immediate work.
- C. Membrane shall be stacked and protected from moisture penetrating the ends.
- D. Deliver all materials and store in their unopened original packaging, bearing and manufacturer's name, related standards and any other specification or reference accepted as standard.
 - 1. When stored outdoors, insulation is to be stacked on pallets or dunnage at least four (4) inches above ground level and covered with "non-sweating" tarpaulins. <u>Factory shrink wrapping is not sufficient protection for insulation regardless of the number of layers of shrink wrapping.</u>
 - Store membrane rolls lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethelene tarpaulins are not acceptable due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

- E. Protect and permanently store all materials in a dry, well-vented and weatherproof location. Only materials to be used the same day shall be removed from this location. During winter, store materials in a heated location with a 50°F. minimum temperature, removed only as needed for immediate use. Keep materials away from open flame or welding sparks.
- F. Carefully store on end materials delivered in rolls with salvage edges up, a minimum of 6 inches above grade. Store metal flashings and counterflashings in such a way as to prevent wrinkling, twisting, scratching and other damage.
- G. Adhesive storage must be between the range of above 40°F and below 80°F. Area of storage shall be suitable for flammable storage.
- H. All materials determined to be damaged (as determined by the Architect or manufacturer's representative) shall be removed from job site and replaced at no cost to Owner. Any insulation which becomes wet must be removed from the jobsite. Any insulation which experiences condensation under the factory shrink wrapping must be removed from the jobsite.

1.10 MANUFACTURER CERTIFICATIONS AND INSPECTIONS

- A. Manufacturer Certification:
 - 1. Submit certification by the manufacturer of the system materials used that these Specifications and the Drawing Details are acceptable to them for the deck and surfacing to which they are to be applied.
 - 2. If details for any manufacturer's systems proposed in the Contract Documents are not acceptable to the manufacturer, submit corresponding details proposed for the particular application, together with the manufacturer's reasons for not accepting the conditions depicted in the Specifications or Drawings. No alternate details will be considered without evidence of valid objections on the part of the manufacturer to the Contract requirements prior to bid due date.
 - 3. No deviation is to be made from this Specification without prior written approval by the manufacturer and the Architect.
 - 4. Submit certification signed by membrane manufacturer's quality control manager that polymer thickness is as specified.

B. Inspection:

- 1. Prior to completion, at least twice during installation, and at completion of the installation, an inspection shall be made by a representative of the manufacturer in order to ascertain that the roofing system has been installed according to their published specifications, standards and details.
- 2. Warranty will be issued upon approval of the installation.
- 3. Copies of manufacturer's inspection reports shall be submitted directly to the Architect, and to the Owner within ten days of the inspection.
- 4. Perform additional inspections at no additional cost, as required to accommodate phasing of the work, partial installations, and as otherwise requested by the Architect to address quality control issues.

1.11 <u>WARRANTY</u>

- A. Upon completion of work, furnish to the Owner the manufacturer's written and signed standard warranty, certifying the performance of his products and the consistency of the properties of such products affecting their performance for a period of **20 years** from date of acceptance.
- B. The Contractor is to cover damages to the building resulting from failure to prevent penetration of water during construction.

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- C. The Contractor is to guarantee all work against defects in materials and workmanship for a period of one year following final acceptance of the Work.
- D. Warranty shall be a No-Dollar-Limit (NDL) total system warranty covering the materials and labor for complete roof system. The Warranty shall not be pro-rated over the term of the warranty and shall not be limited to the original installation cost. Roof system is defined as insulation, overlayment, roof membrane, flashings, coping, counter flashing, termination bars, boots, penetrations, primer, scuppers, roof drain pans, crickets, saddles, fasteners, and all other roofing components needed to create a water tight barrier above the metal deck.
- E. Include the following items within the Warranty:
 - 1. Roofing inspection by Manufacturer's Roofing Quality Control Inspector within 24 months after date of Final Acceptance.
 - 2. Roofing manufacturer will provide unlimited repairs during warranty period with no cost limit.
 - 3. Temporary emergency repairs may be made by Owner without voiding any warranty provisions.
 - 4. Attach copy of Record Document Roof Plan Drawings, Roof Detail Drawings, and Record Membrane Roofing Specification Section to Warranty.
 - 5. Warranty shall cover wind gusts up to 72 miles per hour (sustained), and 90 mph-3 second gust.
 - 6. Colorfastness: no significant change in the color of the membrane during the Warranty period.
 - 7. Warranty shall not exclude "ponding" water, as defined in the NRCA Roofing Guidelines.

1.12 JOB CONDITIONS

- A. Proceed with roofing work when existing and forecasted weather conditions permit work to be performed in accordance with manufacturer's recommendations and warranty requirements. All surfaces to receive insulation, membrane or flashings must be dry.
- B. During roofing work, exposed unfinished surfaces shall be protected with tarps in order to prevent damage. Contractor shall assume full responsibility for any damage. Protect existing building and completed areas of new additions from all risks of damage from inclement weather.
- C. Do not install membrane under the following conditions:
 - 1. The roof assembly permits interior air to pressurize the membrane underside.
 - 2. Any exterior wall has 10% or more of the surface area comprised of open doors or windows or unfinished wall enclosures.
 - 3. The wall/deck intersection permits air entry into the wall flashing area.
- D. Install uninterrupted waterstops at the end of each day's work and completely remove waterstops before proceeding with next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as installation progresses. Replace contaminated membranes at no cost to Owner.
- E. Do not use asphalt, coal tar, heavy oils, roofing cement, creosote or preservatives.
- F. Arrange work sequence to avoid using newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is unavoidable, provide all necessary protection and barriers to segregate work area to prevent damage to adjacent areas and provide plywood protection boards.
- G. Remove all dirt, debris, and dust from all surfaces prior to and during application.
- H. Comply with all safety regulations of authorities having jurisdiction.

- I. All material removed during construction and all waste materials to be immediately removed and legally disposed of off site.
- J. Do not overload the roof deck or building structure.
- K. Keep all solvents, flammable adhesives and deck primers away from open flames, sparks and excessive heat. Keep lids closed at all times on all unused cans. Keep solvents adhesives and primers away from air intake vents. Prevent adhesive odors from entering building.
- L. Verify that all roof drain lines are functioning correctly before beginning work. Report any blockages to Architect.
- M. Repair all damage to existing building and grounds caused by construction work at no cost to Owner.
- N. Wear proper clothing and protective gear at all times, for protection of both the installers and the roof system surfaces, materials and components.
- O. Protect new roof membrane from any asphalt and coal tar residue elsewhere on the project. This residue, whether tracked by foot traffic or in the form of construction dust is detrimental to the new roof membrane. Permanent walk pads are to be placed around roof hatches leading to roof access ladders. Inform any/all other trades accessing or working on the roof of this concern.
- P. Visit the site prior to bidding and carefully examine all existing areas and conditions that may affect proper execution of the work. No claims for extra costs will be allowed because of lack of full knowledge of the existing conditions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide one of the following approved EPDM Roofing Systems (BLACK EPDM):
 - 1. "Firestone Industrial Products"; "Rubber Gard".
 - 2. "Carlisle Tire and Rubber Co."; "Sure-Seal".
 - 3. "Versico Incorporated"; "VersiGard".
 - 4. "Manville, Roofing Systems Division"; "SMP".
 - 5. "International E.P.D.M. Rubber Roofing Systems, Inc."; "135 Glue Down".
 - 6. "GenFlex"; AFR EDPM.

2.02 ROOF SYSTEM

- A. Adhered Elastomeric Membrane Roofing Sheet:
 - 1. E.P.D.M. (Ethylene Propylene Dlene Monomer) compounded elastomer conforming to the latest minimum physical properties of the manufacturer.
 - 2. Minimum thickness: .060 inches.
 - 3. Minimum tensile strength: 1,300 psi (ASTM D 412).
 - 4. Elongation: 250% min. (ASTM D 412).
 - 5. Vapor permeable.
 - 6. Ultraviolet and ozone resistant.
 - 7. Low temperature brittleness of -40°F min. (ASTM D 2137).
 - 8. Sheets shall be as large as possible to minimize seams.

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- B. Flashing:
 - 1. Self curing E.P.D.M. flashing.
 - 2. Minimum thickness: .060 inches.
 - 3. Minimum tensile strength: 1,300 psi (ASTM D 412).
 - 4. Elongation: 300% min. (ASTM D 412).
 - 5. Ultraviolet and ozone resistant.
 - 6. Low temperature brittleness of -40°F min. (ASTM D 2137).
 - 7. Color to match sheet membrane.
- C. Bonding Adhesive:
 - 1. Compatible with materials to which membrane is to be bonded and recommended by membrane manufacturer.
 - 2. Formulated to withstand minimum 90 psf uplift force.
- D. Sheet Seaming System:
 - 1. Manufacturer's standard materials for sealing lapped joints, including edge sealer to cover exposed spliced edges as recommended by membrane manufacturer.
- E. Termination Bars, Cant Strips and Flashing Accessories:
 - 1. Types recommended by membrane manufacturer provided at locations indicated and at locations recommended by the manufacturer, and including adhesive tapes, flashing cements, and sealants.
- F. Roof Walkway Pads:
 - 1. Description:
 - a. EPDM Walkway Pads.
 - b. 3/8" x 30" x 30" with Patterned traffic bearing surface.
 - 2. Provide as indicated on Drawings. If not indicated, provide around roof hatch, around all rooftop equipment, and at the bottom and tops of all rooftop ladders. Provide additional walkpads for access between rooftop equipment, and to provide path from hatch to equipment and ladder, whether or not indicated on Drawings.
 - 3. Color to match sheet membrane.
- G. Overnite tie-in sealants as recommended by manufacturer, but in no instance is hot asphalt permitted.

2.03 PRE-MANUFACTURED METAL COPING

- A. Provide products, as approved by the Architect, by one of the following approved manufacturers:
 - 1. "Metal-Era".
 - 2. "Hickman".
 - 3. "MM Systems".
 - 4. Architectural Products Company".
- B. Product:
 - 1. Basis of Specification: "Metal-Era", Anchor-Tite Fascia, AF Series.
 - 2. Extruded aluminum fascia, splice plate, and galvanized steel cant dam. Snap on type exposed fascia cover.
 - 3. Extruded Aluminum 6063-T5 Alloy.
 - Size to be selected from the manufacturer's standard sizes of 4", 5-1/2", 7" or 8-1/2". See Drawings for sizes. If not indicated, provide 7" height. See details and drawings for special conditions that may require differing sizes.
 - 5. .040" thickness minimum, aluminum.
 - 6. 12'-0" lengths.
 - 7. Compression screw and clamp for non-penetrating securing of roof membrane.

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- 8. All corners to be mitered and fully welded, then factory finished.
- 9. Coping to have concealed splice plates and corrosion resistant fasteners.
- 10. No exposed fasteners permitted.
- 11. FM I-120 approved.
- 12. Finish: Kynar 500, 20-year finish warranty.
- 13. Color as selected by Architect from manufacturer's entire standard selection. Provide custom color if required to match a specified color or if indicated to match existing.

2.04 FASTENERS

- A. Fastening systems shall use fasteners approved for use by the membrane manufacturer, designed metal and wood decks, and for adhesion of flashing to the substrates encountered.
- B. Insulation and Overlayment:
 - 1. Mechanical fasteners with fastener plates to secure insulation to decking shall be approved by the insulation manufacturer for the system specified.
 - 2. The same brand fastener is to be used throughout the work.
 - 3. Number of fasteners and layout will be recommended by the manufacturer and as per FM Approval Guide for I-90 wind uplift. Install additional fasteners as directed in the field by the Architect.
 - 4. Length of fastener shall be determined by the thickness of the decking and may vary with the thickness of the insulation. Fasteners shall be appropriate lengths to achieve a minimum of 1 inch penetration. Contractors shall ensure that fasteners do not penetrate roof deck to exposed interior.
 - 5. The fastener and plate shall be used in all areas for attachment of the membrane. The length of the fastener shall be determined by the thickness of the insulation allowing for a 1 inch penetration into the deck, or as otherwise determined by the membrane manufacturer, but not less than 1 inch.

2.05 WOOD BLOCKING AND SHEATHING

- A. All nailers and blocking material to be free of wane, shake, decay or checks.
 - 1. Blocking shall not be less than Construction Grade, Southern Pine, max. 19% moisture content.
 - 2. Provide manufacturer's recommended protection between blocking for equipment, piping, and conduit supports above roof. Provide solid wood blocking as required for fastening and terminating membrane and flashing system. Install at the perimeter of the entire roof and around other roof projections and penetrations. Thickness of nailers must match the insulation thickness to achieve smooth transition.
 - 3. See Section 06100 Rough Carpentry for further requirements of blocking with regards to Preservative Treated Wood and Fasteners in Treated Wood.
- B. Plywood to be minimum 1/2 inch thick CDX (C side out), smooth surfaced, exterior grade, with exterior grade glues. Provide where indicated on Drawings. Whether indicated on Drawings or not, provide at all existing masonry and concrete walls where membrane is installed and at all other locations required by manufacturer, and no change in contract price. Prime all plywood prior to membrane installation.

2.06 ROOF INSULATION

- A. Provide one of the following approved products:
 - 1. "Firestone"; ISO 95+ Polyisocyanurate Insulation.
 - 2. "GenFlex"; ISO.
 - 3. "Versico Incorporated"; MP-H POLYISO.

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- B. Polyisocyanurate Board Insulation:
 - 1. Reference Standards:
 - a. FS HH-I-1972/Gen.
 - b. FS HH-I-1972/2.
 - c. FS HH-I-1973/3.
 - d. ASTM C 209 Water Absorption.
 - e. ASTM E 96 Water Vapor Transmission of Materials.
 - f. ASTM D 1621 Compressive Strength.
 - g. ASTM D 1622 Density.
 - h. ASTM D 2126 Dimensional Stability.
 - i. ASTM E 84 Flame Spread.
 - 2. Quality Control:
 - a. Verify insulation furnished is compatible with and suitable for the specified roofing system, including roofing conditions, installation procedures and type of membrane to be used.
 - 3. Description:
 - a. Rigid cellular thermal insulation with glass-fiber reinforced polyisocyanurate closed-cell foam core and asphalt/glass fiber felt facing laminated to both sides.
 - b. Complying with Federal Specification HH-I-1972/2.
 - c. 20 psi minimum.
 - d. Aged R-value of 5.56 per inch, minimum, at 75°F respectively.
 - e. Nominal Size 48 inches x 48 inches.
 - 4. Thickness:
 - a. Thickness as indicated on the Drawings (not including tapered saddles and crickets). If not indicated, provide 5 inches (with a minimum 23.75).
 - 5. Layers:
 - a. Unless indicated otherwise, insulation is to be installed in two layers.
 - b. One layer of insulation is allowed at the following conditions:
 - 1) Where total insulation thickness is 2 inches or less.
 - 2) Where an overlayment board is specified as part of the roof system, provided that the joints are staggered between the insulation board and the overlayment board.
- C. Polyisocyanurate Tapered Insulation:
 - 1. Quality Control:
 - a. Meet all Reference Standards for Polyisocyanurate Board Insulation as specified herein.
 - b. Meet or exceed all UL and FM test requirements and roof membrane manufacturer's requirements for installation and warranty.
 - c. Contact the manufacturer's representative for any tapered design assistance.
 - 2. Description:
 - a. Same materials as Polyisocyanurate Board Insulation specified herein, but manufactured in a tapered profile.
 - b. Provide tapered insulation, saddles and crickets atop board insulation as indicated on the Drawings and/or specified herein.
 - 3. Thickness and Slope:
 - a. Tapered Insulation:
 - 1) Tapered insulation areas to be provided in thickness and slope indicated (not including tapered saddles and crickets), or if not indicated, minimum 1/4 inch per foot slope.
 - b. Saddles and Crickets:
 - 1) Slope as required to direct water away from the item the saddle or cricket is protecting, minimum 1/4 inch per foot slope.
- D. Mechanical Anchors:
 - 1. Reference Standards:
 - a. SAE 1022, Heat Treated.

- 2. Type:
 - a. As recommended by insulation manufacturer for deck type, and complying with fire and insurance requirements.
 - b. Fastener plates are to be a flat profile to minimize telegraphing through membrane at steep slope roof.
- 3. Description:
 - a. Heavy-duty threaded fastener with 3-coat waterborne fluorocarbon polymer coating and drill point tip capable of penetrating 20-gauge steel.
 - b. Fastener shall meet minimum thread size of .260 inches and 13 threads per inch.
 - c. Length shall be sufficient to penetrate deck a minimum of 3/4 inch for steel and 1 inch for wood and concrete.
 - d. Structural concrete decks must be pre-drilled with a 7/32 inch carbide drill bit to a depth 1/2 inch deeper than the fastener engagement.
- E. Adhesive Anchoring:
 - 1. Where required, use high velocity insulation adhesive as recommended by membrane manufacturer and meeting FM 1-90.

2.07 OVERLAYMENT BOARD

- A. Provide one of the following products, pending compliance with the manufacturer's warranty:
 - 1. "Georgia Pacific", "Dens Deck"(siliconized gypsum).
 - 2. "Firestone", "Coverdeck 250" (siliconized gypsum).
 - 3. "Firestone", "IsoGard HD Coverboard" (polyisocyanurate).
- B. Description of Acceptable Types:
 - 1. Siliconized gypsum, fire tested hardboard with heat cured glass-mat facers; 1/4" thick.
 - 2. High-density, closed-cell polyisocyanurate foam core with a coated glass facing sheet; 1/2" thick.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Before commencing work, the Owner's representative, together with the roofing contractor and manufacturer field supervisor shall inspect and approve the deck condition (slopes and nailing supports if applicable) as well as verticals on parapet walls, roof drains, stack vents, vent outlets and others, building joints, etc. If applicable, a non-compliance notice shall be submitted to the contractor so that adjustments can be made. Commencement of work shall imply acceptance of surfaces and conditions, and responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.
- B. Any standing water or snow shall be completely removed from the area prior to starting roof work.
- C. Before commencing work, all surfaces shall be smooth, clean, dry and free of any debris that would adversely effect the installation of the membrane.
- D. All roof penetrations shall be made prior to installation of the roofing membrane. Verify that the work of other trades has been properly completed.
- E. Prevent compounds from entering and clogging drains and conductors, and from spilling or migrating onto surfaces or other work.

- F. Environmental Requirements:
 - 1. Do not work in rain, snow, or in presence of water.
 - 2. Roofing installation may continue in cold weather provided adhesives and sealants are stored at room temperature and used within a 4 hour period after being exposed to lower temperatures.
 - 3. Remove any work exposed to freezing.
- G. All surface voids of the immediate substrate greater than 1/4 inch wide must be properly filled with an acceptable insulation or suitable fill material.
- H. Protect metal, glass, plastic, and painted surfaces from adhesives and sealants.
- I. Protect neighboring work, property, cars, and persons from spills and overspray from adhesives, sealants and coatings and from damage related to roofing work.
- J. Protect finished areas of the roofing system from roofing related work traffic and traffic by other trades.

3.02 SURFACE PREPARATION

- A. Clean all debris.
- B. Replace damaged or defective areas prior to commencement of work under this Section.
- C. Protect adjacent building surfaces and equipment from damage.
- D. Maintain all equipment and tools in good working order.

3.03 INSULATION APPLICATION

- A. Install roof insulation with overlayment, with joints staggered. Install and fasten at a rate to meet specified uplift requirements. Fasteners must meet an average pullout of 300 lbs. No gaps between boards, nailers and penetrations greater than 1/8 inch permitted.
- B. Do not install insulation which has been allowed to become wet, or has had any contact with water. Remove all insulation which becomes wet. Remove broken, delaminated and damaged insulation.
- C. Install insulation and overlayment board at all faces of all curbs. Coordinate with other trades as required. Verify that existing mechanical equipment will still fit over curb after installation of new insulation. Contact Architect for instruction if it appears that equipment will not fit.

3.04 FASTENING REQUIREMENTS - MECHANICALLY FASTENED INSULATION SYSTEM

- A. Design for Exposure Category C, 90 mph, 3 second gust. Provide calculations showing compliance with ASCE 7-98, SPRI, and FM requirements for wind uplift.
- B. Penetrations require the use of 3 head lap fasteners in field areas. Target must be installed around penetration and fastened in all four directions within 3'-0" x 3'-0" area.
- C. Curbs are to be treated as perimeters for density protocol. Area must assume a minimum of a 3 foot dimension from edge of curb out onto the field areas.
- D. Insulation Attachment Top Layer:
 - 1. Full depth of all layers of approved rigid insulation and overlayment board.
 - 2. Top Layer Attachment: Mechanically Attached.

3.05 INSTALLATION

- A. All membrane installation is to be in strict accordance with the manufacturer's instructions. Install membrane by unrolling over prepared substrate, lapping adjoining sheets as recommended by manufacturer.
- B. For Adhered Membranes:
 - 1. Apply adhesive to surfaces to be bonded according to manufacturer's instructions.
 - 2. Use solvent based adhesive except where local ordinances prohibit use.
 - 3. Do not use solvents where fumes can migrate into existing or occupied portions of building. If occupants of the building or people nearby the project complain about solvent odor, discontinue use and use water based adhesive.
 - 4. Roll membrane into place when adhesive has properly cured.
- C. Sealing of Seams:
 - 1. Treat seams with special cement and apply sealant to exposed sheet edges, tapering application as recommended by the manufacturer.
 - 2. Check all sealed seams for continuity using a rounded screwdriver, or cotter pin puller type tool. Do not probe seams until they have cured and reached the ambient temperature. On-site evaluation of sealed seams to be made daily by the Contractor at locations as directed by the Architect, the Owner's Representative, or the membrane manufacturer.
 - 3. Roll all seams as the work progresses with silicone coated steel hand roller.
- D. Install mechanical fasteners, flashings and counter-flashings and accessories at locations shown on the Drawings and as recommended by the manufacturer.
 - 1. Secure membrane at all locations where the membrane terminates or goes through an angle change greater than 1 inch in 12 inches, except for round pipe penetrations less than 18 inches in diameter an square penetrations less than 4 inch square.
 - 2. Use same membrane for flashing and field.
- E. Flashings:
 - 1. Install all flashing concurrently with the roof membrane as the job progresses. Do not use temporary flashing unless approved in writing by Architect and membrane manufacturer. Remove and replace any materials that become wet as a result of improper or inadequate coverage of roof with membrane and permanent flashing.
 - 2. Adhere flashing in accordance with manufacturer's instructions, and paragraph above for adhered membranes.
 - 3. Install transition material at base of all transitions, peaks and valleys as required by manufacturer.
 - 4. Extend all flashing a minimum of 8 inches above roofing level, unless approved in writing by manufacturer and Architect.
 - 5. Mechanically fasten all flashing membranes along the counter flashed top edge. Provide termination bar, sealant, and counterflashing at all terminations.
 - 6. Install coping in accordance with manufacturer's instructions. Any cut edges of metal are to be neat, straight, and at right angles. Paint exposed metal at cut edges with paint to match factory finish.
- F. Flashing Penetrations:
 - 1. General:
 - a. Flash all penetrations passing through the membrane.
 - b. The flashing seal must be made directly to the penetration.

- 2. Pipes, Round Supports, etc.:
 - a. Flash with manufacturer's prefabricated, pre-molded Pipe Flashings where practical.
 - b. Flash using unsupported Flashing membrane when Pre-Molded Flashing is not practical.
- 3. Structural Steel Tubing:
 - a. Use a field fabricated pipe-flashing detail provided that the minimum corner radius is greater than 1/4 inch and the longest side of the tube does not exceed 12 inches. When the tube exceeds 12 inches: use a standard curb detail.
- 4. Pipe Clusters and Unusual Shaped Penetrations:
 - a. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
 - b. Secure penetration pockets per manufacturer Details.
 - c. Fill penetration pockets with Pourable Sealer, so as to shed water.
- 5. Hot Pipes:
 - a. Protect the roof membrane and components from direct contact with steam or heat sources when the in-service temperature is in excess of 140 degrees F. In all such cases flash to an intermediate insulated "cool" sleeve per manufacturer details.
- 6. Flexible Penetrations:
 - a. Provide a weather tight gooseneck set in Water Block Seal and secured to the deck.
 - b. Flash in accordance with manufacturer Details.
- 7. Expansion Joints:
 - a. Install as shown on roof drawings in accordance with manufacturer details.
- G. Walkpads:
 - 1. Install walkpads according to manufacturer's instructions.
 - 2. Pads to be installed straight, even, and in line with building walls.
 - 3. Turns are to be at right angles.
 - 4. Install walk pads where indicated on drawings, or if not indicated, around all roof hatches, at tops and bottoms of all ladders, and around any rooftop mechanical units (RTU's), and as otherwise indicated. Pads must be heat welded, and not applied using adhesive.

3.06 WATER CUT-OFF

- A. At the end of the day's work, and when precipitation is eminent, a water cut-off shall be constructed at all open edges. Construct the cut-off with the same membrane that is used for the roofing system. Cut-off must be able to withstand extended periods of wet weather. The water cut-off shall be completely removed prior to resuming the installation of the roofing system. Hot asphalt cut-offs are not permitted.
- B. Remove all membrane and insulation damaged by waterstop installation, or infiltration of water around waterstop, prior to resuming work.
- C. If inclement weather occurs while a temporary waterstop is in place, monitor the situation as necessary to maintain a watertight condition.
- D. If any water is allowed to enter under the newly completed roofing, remove and replace the affected area and repair all damage at no additional cost to Owner.

3.07 <u>CLEAN UP</u>

A. Clean up and remove daily from the site all wrappings, empty containers, paper, loose particles and other debris resulting from these operations. Do not allow any material into roof drains, gutters and downspouts.

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- B. Remove markings from finished surfaces.
- C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.08 PROTECTION

- A. Provide traffic ways, erect barriers, fences, guards, rails, enclosures, chutes and the like to protect personnel, roofs, structures, vehicles and utilities.
- B. Plywood for traffic ways required for material movement over existing roofs shall be not less than 5/8 inch thick.

3.09 FIELD CONTROL

- A. Field inspection will be performed as outlined elsewhere in this Section, under Part 1 Manufacturer Certifications and Inspections.
- B. Correct all punchlist items from Architect and Manufacturer's Field Representative prior to demobilization from the project.

SUBMITTAL CHECKLIST

- 1. Compliance Confirmation.
- 2. Samples.
- 3. Product Data.
- 4. Shop Drawings.
- 5. Certificates.
- 6. Warranty.

END OF SECTION 07531

SECTION 07600 - FLASHING, SHEET METAL AND ROOF ACCESSORIES

PART 1 – GENERAL

1.01 WORK INCLUDED

- A. The extent of each type of flashing and sheet metal work is indicated on the drawings and by provisions of this section.
- B. The types of work specified in this section include, but are not limited to, the following:
 - 1. Metal wall flashing and expansion joint.
 - 2. Exposed metal trim/fascia units.
 - 3. Miscellaneous sheet metal accessories.
 - 4. Metal scuppers.
 - 5. Metal downspouts.
 - 6. Sheet metal flashing at windows and exterior doors.
 - 7. For Pre-manufactured metal coping. See Section 07531.
- C. Gutters and downspouts may be either aluminum or galvanized steel as approved by the Architect. The intent is that all metal work shall have the same and consistent finish so as to appear as a cohesive installation. Coordinate with coping, fascia, soffits, flashings, trim, etc.

1.02 QUALITY ASSURANCE

A. Sheet metal flashing and trim shall conform with recommended practices contained in "Architectural Sheet Metal Manual", Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).

1.03 <u>SUBMITTALS</u>

A. Shop Drawings:

Show typical details of formed configuration, seams, joints, thicknesses, dimensions, fastening and anchoring methods.

- B. Samples:
 - 1. 6 inch x 6 inch piece of metal and each type fastener.
 - 2. Colors to be selected from manufacturer's entire standard selection.

1.04 JOB CONDITIONS

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Insure best possible weather resistance and durability of the work and protection of materials and finishes.
- B. Do not proceed with the installation of flashing and sheet metal work until curb and substrate construction, cant strips, blocking and other construction to receive the work is completed.

1.05 WARRANTY

A. The Project warranty provided by the Contractor shall include agreeing to repair or replace sheet metal and flashing which has failed to fulfill performance requirements of waterproofing due to defective materials, workmanship or improper installation, during the warranty period.

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1.06 <u>FINISHES</u>

- A. As shown on the Drawings or as selected from manufacturer's entire selection.
- B. All colors and finishes are to be as selected by Architect.
- C. Custom color may be required to produce a match to that selected.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Stainless Steel:
 - 1. ASTM A 167, soft temper, Type 304.
 - 2. 26 gauge (.018 inches) sheet.
 - 3. Finish 2D, dull; ASTM A 480.
- B. Galvanized Steel:
 - 1. ASTM A 525, coating G90.
 - 2. Thickness (minimum):
 - a. 18 gauge.
 - b. 26 gauge flashing.
 - c. 24 gauge gutters.
 - d. 22 gauge, downspouts.
- C. Aluminum:
 - 1. ASTM B 209, Alloy 5005-H134.
 - 2. Thickness (minimum):
 - a. .032 inches, or as otherwise indicated on Drawings.
 - b. .032 inches, gutters.
 - c. .032 inches, downspouts.
 - 3. Finish: Fluoropolymer enamel.
- D. Copper:
 - 1. ASTM B 370, cold rolled sheet.
 - 2. Weight: 16 oz.
- E. Lead Coated Copper:
 - 1. ASTM B 101, Class A, cold rolled sheet.
 - 2. Weight: 16 oz.
- F. Solder:
 - 1. ASTM B 32.
 - 2. 50-50 Block tin and pig lead; 40-60 lea and tin for lead coated copper.
- G. Fasteners:
 - 1. Stainless Steel nails, flat-head.
 - 2. Galvanized steel, hot dipped, flat head.
 - 3. Hard copper, brass or bronze, flat-head, 12 gauge for copper and lead coated copper.
- H. Cleats:
 - 1. 2 inches wide, 3 inches long piece of sheet metal.
 - 2. 16 oz., unless otherwise specified.

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- I. Flux:
 - 1. Rosin or muriatic acid neutralized with zinc.
- J. Bituminous Paint:
 - 1. Asphalt emulsion, ASTM D 1187, Type A.
- K. Sealant:
 - 1. One-part butyl rubber sealant, FS TT-S-00657, Type 1.
- L. Metal Accessories:
 - 1. Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, non-corrosive, size and gauge required for performance.

M. Coil Stock:

1. "Alcoa Aluminum" with Almalure 2000, 2-coat acrylic topcoat resin.

2.02 FABRICATION

- A. Form metal flashing and trim to configurations indicated on the Drawings, free from defects which impair strength or mar appearance.
- B. Remove acid flux residue by neutralizing and scrubbing with ammonia or washing with soda solution. Rinse with clean water.
- C. Tin edges of plain copper sheets to be soldered for a width of 1-1/2 inches both sides with solder.
- D. Seams:
 - 1. Make seam in direction of flow.
 - 2. Seams must be soldered or locked, unless otherwise approved.
 - 3. Gutter and downspout seams may be lapped.
 - 4. Standing seams shall finish not less than 1" high unless otherwise specified.
 - 5. Flat-Lock Seams, Soldered and unsoldered: Finish not less than 3/4" wide.
 - 6. Lap Seams, Soldered: Finish not less than 1" wide.
 - 7. Lap Seams, Unsoldered: Overlap 3" unless otherwise noted.
 - 8. Loose-Lock Seams, Unsoldered: 3" common, or hook, seam, filled with sealant.
- E. All exposed edges not seamed shall be hemmed, bent back 1/2 inch to unexposed side.
- F. Furnish edge strips where sheet metal extends over edges and where necessary to secure sheet metal work at fascia, gravel stops, etc. Form edge strips of compatible material.

2.03 PRE-MANUFACTURED METAL COPING – See Section 07531

PART 3 - EXECUTION

- 3.01 <u>GENERAL</u>
 - A. Examine all surfaces to receive the metal flashing and trim. Verify all dimensions of in-place and subsequent construction. Installation of metal flashing and trim constitutes acceptance of the existing conditions.
 - B. Surfaces to which sheet metal is to be applied shall be smooth, sound, clean, dry and free from defects that might affect the application.

- C. Erect all member plumb, level and in line securely anchored and properly related to other parts of the Work.
- D. Protect metal surfaces which are to be in contact with dissimilar metals, with wood or other absorptive material, with roofing felt, building paper or a coat of bituminous paint specified to prevent galvanic or corrosive action. Protection shall not extend onto exposed surfaces.

3.02 INSTALLATION

- A. Base Flashing:
 - 1. On roofing where shown, extend flashing up vertical surfaces not less than 8 inches unless otherwise shown, and 4 inches horizontally out on the roof.
- B. Insert Flashing:
 - 1. Preform, interlock and bed insert flashing, extend horizontally from face of wall to backing, extend vertically and insert in reglet: Secure as hereinafter specified.
- C. Counterflashing:
 - 1. Overlap base flashing 4 inches.
- D. Securing Flashing and Reglets:
 - 1. Open Slot Reglets:
 - a. Turn sheet metal into open slot reglets and secure with lead or copper plugs at approximately 12 inches o.c.
 - 2. Friction Type Reglets:
 - a. Turn sheet metal into friction type reglets and secure by indenting slot 12 inches o.c. with a dull punch or by means of "thumbnail" notches in sheet metal at 12 inches o.c.
- E. Cleats:
 - 1. Where required to retain flashing, provide cleats specified, spaced not more than 12 inches o.c. Secure one end with two nails and fold clip back over nail heads. Lock free end of cleat into seam or into folded edge of sheet metal.
- F. Roof Penetration Flashing:
 - 1. Base Flashing:
 - a. Extend flange onto roof 6 inches minimum away from penetration.
 - b. Extent Flange upward around penetration to at least 2 inches above floor line.
 - c. Fold back upper an side roof flange edges 1/2 inch minimum.
 - d. Solder lap joints.
 - 2. Counterflashing:
 - a. Provide sealant around penetrations through flashing.
- G. Reglets:
 - 1. Install in accurate location, straight in-line, with leakproof joints.
- H. Drip Edge:
 - 1. Extend 4 inches wide up from eave edge full eave length.
 - 2. Set into asphalt flashing cement, full width.
 - 3. Secure with aluminum annular ring nails 12 inches o.c.
- I. Apron flashing at roof sloping away from vertical surface:
 - 1. Extend up vertical surface to first masonry joint (if applicable), and onto roofing minimum 4 inches.
 - 2. Hem bottom edge 1/2 inch.

- 3. Lap seam vertical joints minimum 3 inches and apply sealant engaging hemmed edged.
- 4. Miter and solder joints: extend minimum 3 inches around corners.
- 5. Install bottom edge tight against roofing.
- 6. Counter flash top edge.
- J. Cricket Flashing:
 - 1. Form to slope away from vertical surface.
 - 2. Extend up vertical surface minimum 4 inches and 8 inches onto roof surface, with edges folded back 1/2 inch.
 - 3. Solder lap joints: cleat to substrate.

K. Rake Flashing:

- 1. Extend horizontal flange 3 inches under roofing and nail to substrate.
- 2. Extend vertical face of fascia.
- 3. Lap seam joint in direction of flow.
- L. Scuppers:
 - 1. Locate straps at downspout tops, bottoms and at 10 feet maximum centers.
 - 2. Secure straps to wall with fasteners heads covered with strap tabs.
 - 3. Fit strainers tightly in each downspout.
 - 4. Extend minimum 3 inches into storm drain hub.
 - 5. Grout with Portland cement to close opening and trowel top surface to slope away from downspout.
- M. Downspouts:
 - 1. 3" x 4", plain square profile, unless otherwise indicated.
 - 2. Form with flat sheet material, plain rectangular size indicated.
 - 3. Fabricate longitudinal joints with flat lock seams.
 - 4. Telescope upper sections onto lower sections 1-1/2 inches minimum.
 - 5. Rivet and solder.
 - 6. Attach to wall with 1 inch wide straps matching downspout material, 1 gauge heavier.
 - 7. Locate straps at downspout tops, bottoms, and at 10 feet maximum centers.
 - 8. Secure straps to wall with fastener heads covered with strap tabs.
 - 9. Fit strainers tightly in each downspout.

3.03 CLEANING AND PROTECTION

- A. Remove all flux, scraps and dirt as work progresses. Neutralize excess flux with a 5 to 10 percent solution of washing soda and surface drenched with clean water.
- B. Protect flashing and sheet metal work during construction to insure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

SUBMITTAL CHECK LIST

- 1. Shop Drawings.
- 2. Samples.

END OF SECTION 07600

SECTION 07650 - FLEXIBLE FLASHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Flexible flashing as shown for drawings and specified herein. Including, but not limited to thru-wall flashing and other flashing for masonry work.

1.02 <u>SUBMITTALS</u>

A. Submit manufacturer's data sheets for each product used.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS AND TYPES

- A. Provide one of the following or an approved equivalent:
 - 1. "AFCO" Cop-A-Bond Duplex.
 - 2. "York Manufacturing" Cop-R-Tex Duplex.
 - 3. "Advanced Building Products" Cop-R-Kraft Duplex.

2.02 <u>MATERIAL</u>

- A. Copper:
 - 1. Full sheet copper.
 - 2. 2 oz. per square foot.
 - 3. Bonded on both sides with kraft paper and asphalt, waterproofed.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Whether shown on Drawings or not, install flashing at the following locations:
 - 1. Install at heads and sills of all openings in walls, base courses, sill courses, angles and wall penetrations.
 - 2. Install thru-wall flashing at top course of all brick walls at retaining walls, planter walls, walls at site stairs and ramps, and all other similar conditions.
- B. Extend flashing 6" beyond opening or joint.
- C. Build in flashing with mortar as masonry work progresses.

SUBMITTAL CHECK LIST

1. Manufacturer's material data sheet.

END OF SECTION 07650

SECTION 07725 - ROOF SCUTTLE AND LADDER

- 1.01 WORK INCLUDED
 - A. Provide non-rated roof hatch scuttle, ladder and telescoping safety post as shown on the Drawings and specified herein.
 - B. Provide safety rail system at each roof hatch opening location.

1.02 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's product data sheets, cutsheets, specifications, materials description, installation and maintenance instructions.
- B. Shop Drawings:
 - 1. Plans, elevations, sections, details and equipment list.
 - 2. Indicate construction of units, field verified dimensions and all construction detailing required to coordinate with installation requirements.

C. Warranty:

1. Provide copy of warranty as specified herein.

1.03 WARRANTY

A. Provide manufacturer's written warranty against defects in materials and workmanship for a period of five (5) years from the date of Substantial Completion.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following approved manufacturers:
 - 1. "Bilco"
 - 2. "Dur-Red"
 - 3. "Milcore"
 - 4. "Western Canwell"
 - 5. "Babcock-Davis"

2.02 MATERIALS

- A. Equipment Roof Hatch Scuttle:
 - 1. Basis of Specification: "Bilco", Model NB-50
 - 2. Size: 5'-4" length x 2'-6" width.
 - 3. Aluminum cover with overlapping flange, aluminum frame.
 - 4. 11 gauge cover and frame.
 - 5. Standard factory mill finish.
 - 6. Manufacturer's standard integral 12" high curb with integral cap flashing, fully welded.
 - 7. Cover of breakformed hollow design with minimum 1" concealed insulation, overlapping flange with fully welded corners.
 - 8. Cover to be internally reinforced to resist a live load of 40 psf.

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D. Safety Rail:

- 1. Basis of Specification: "Bilco", Type "SEF", Bil-Guard.
- 2. Performance characteristics:
 - a. Hatch rail system shall attach to the capflashing of the roof hatch and shall not penetrate any roofing material.
 - b. Hatch rail system shall satisfy the requirements of OSHA 29 CFR 1910.23 and shall meet OSHA strength requirements with a factor of safety of two.
 - c. UV and corrosion resistant construction with a twenty-five year warranty.
 - d. Self-closing gate shall be provided with hatch rail system.
- 3. Posts and Rails: Shall be round pultruded reinforced fire retardant yellow fiberglass treated with a UV inhibitor.
- 4. Hardware: Mounting brackets shall be 1/4"thick hot dip galvanized steel. Hinges and post guides shall be 6063T5 aluminum. Fasteners shall be Type 316 stainless steel.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instruction.
- B. Shim curb as required for level installation.
- C. Securely fasten all surfaces, clean, smooth and free from burrs or rough edges.
- D. Install flashing under Division 7.

SUBMITTAL CHECKLIST

- 1. Product Data.
- 2. Shop Drawings.
- 3. Warranty.

END OF SECTION 07725

SECTION 07840 - FIRESTOPPING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Firestopping for fire-rated construction, this includes:
 - 1. All openings in fire rated floors and wall assembles, both blank (empty) and those accommodating penetrating items such as cables, conduits, pipes ducts, etc.
 - 2. Gaps (openings) between exterior entrys, storefronts and curtain walls and the outer perimeter edge of the structural floor.
 - 3. Openings at each floor level in shafts or stairwells.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 03300 - Cast-In-Place Concrete Section 04220 - Concrete Unit Masonry Section 07900 - Joint Sealers Section 09251 - Gypsum Drywall – Wood Stud Construction Division 15 - Mechanical, Plumbing and Sheet Metal Division 16 - Electrical Work

1.03 <u>REFERENCES</u>

- A. American Society for Testing and Material Standards (ASTM):
 - 1. ASTM E814-88: Standard Test method for Fire Tests of Through-Penetration Firestops.
- B. Underwriters Laboratories, Inc. (UL):
 - 1. UL 1479 Fire Tests of Through Penetration Firestops (Consult UL Fire Resistance Directory).

1.04 QUALITY ASSURANCE

- A. Firestopping systems (materials and design) shall conform to both Flame (F) and Temperature (T) ratings as required by local building code and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire tests in a configuration that is representative of field conditions. The F rating must be a minimum of one (1) hour but not less than the fire resistance rating of the assembly being penetrated. T rating when required by code authority shall be based on measurement of the temperature rise on penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
- B. Firestopping materials and systems must be capable of closing or filling through-openings created by:
 - 1. The burning or melting of combustible pipes, cable jacketing, or pipe insulating materials, or
 - 2. Deflection of sheet metal due to thermal expansion (electrical & mechanical duct work).
- C. Firestopping material shall be asbestos free and shall not incorporate nor require the use of hazardous solvents.
- D. Firestopping materials shall not shrink upon drying as evidenced by cracking or pulling back from contact surfaces.
- E. Do not use any firestopping products which after curing dissolve in water.
- F. All firestopping materials shall be manufactured by one manufacturer (to the maximum extent possible).
- G. Installation of Firestopping systems shall be performed by a contractor (or contractors) trained or approved by the Firestop manufacturer.

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- H. Installation of firestopping systems shall be performed by a contractor (or contractors) trained or approved by the firestopping manufacturer.
- I. Equipment used shall be in accordance with the Manufacturer's written installation instructions.

1.05 SUBMITTALS

- A. Manufacturer's Data Sheets:
 - 1. Submit manufacturer's product literature for each type of firestopping material to be installed. Literature shall indicate product characteristics, typical uses, performance and limitation criteria and test data.
 - 2. Material Safety Data Sheets (MSDS) for each firestop product.
 - 3. Submit manufacturer's installation procedures for each type of product.

B. Shop Drawings:

- 1. Show typical installation details for the methods of installation.
- 2. Indicate which firestop materials will be used, where, and thickness for different hourly ratings.
- C. UL Test Data:
 - 1. Submit UL test data sheet and assembly information.
 - 2. Identify by UL number the system for which the product comprises, or is a part of.
 - 3. Identify approved tested hourly rating.
 - 4. Identify flame (F) and temperature (T) ratings.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver material in the manufacturer's original, unopened containers or packages with the manufacturer's name, product identification, lot number, UL label and mixing and installation instructions as applicable.
- B. Store materials in the original, unopened containers or packages, or under conditions recommended by the manufacturer.
- C. All firestopping materials shall be installed prior to expiration of shelf life.

1.07 PROJECT CONDITIONS

A. Conform to Manufacturer's printed instructions for installation and when applicable, curing in accordance with temperature and humidity. Conform to ventilation and safety requirements.

1.08 SEQUENCING

- A. Coordinate this work as required with the work of other trades.
- B. Firestopping shall precede gypsum board finishing.

1.09 PROTECTION

A. Where firestopping is installed at locations which will remain exposed in the completed work, provide protection as necessary to prevent damage to adjacent surfaces and finishes, and protect as necessary against damage from other construction activities.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Firestopping materials and systems shall meet the requirements specified herein.
- B. Architect must approve in writing any alternates to the materials and systems specified herein.

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C. All firestop products and systems shall be designed and installed so the basic sealing system will allow the full restoration of the thermal and fire resistance properties of the barrier being penetrated with minimal repair if penetrants are subsequently removed.

2.02 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, by one of the following approved manufacturers:
 - 1. "Specified Technologies Inc." (STI)
 - 2. "Dow Corning Corp." (Dow)
 - 3. "3M Fire Protection Products" (3M)

2.03 MATERIALS

- A. Firestop Mortar:
 - 1. "STI", SpecSeal Mortar.
- B. Firestop Sealants and Caulks:
 - 1. "STI SpecSeal Sealant
 - 2. "Dow", Firestop Sealant No. 2000
 - 3. "3M", CP25WB+ Caulk
- C. Firestop Putty:
 - 1. "STI", SpecSeal Firestop Putty Bars and Pads
 - 2. "3M", MPS-2 Moldable putty Stix and Putty Pads
- D. Firestop Collars:
 - 1. "STI", SpecSeal Firestop Collars
 - 2. "3M", PPD Collars
- E. Wrap Strips:
 - 1. "STI", SpecSeal Wrap Strip
 - 2. "3M", FS-195 Wrap Strip
- F. Accessories:
 - 1. Forming/Damming Materials: Mineral fiberboard or other type recommended by Manufacturer.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions where firestoppings is to be installed and notify the Architect of conditions determined to the proper and timely completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected by the contractor in a manner acceptable to the Architect.
- B. Verify that environmental conditions are safe and suitable for installation of firestopping products.

3.02 CONDITIONS REQUIRING FIRESTOPPING

A. General:

- 1. All through-penetrations, construction gaps, joints and through openings occurring in, adjacent to or between fire-rated floor/ceilings
- 2. Insulation types specified in other Sections shall not be installed in lieu of firestopping material specified herein.
- 3. All combustible penetrants (I.E. non-metallic pipes or insulated metallic pipes) shall be firestopped using products and systems tested in a configuration representative of the field condition.

3.03 INSTALLATION

- A. General:
 - 1. Installation of firestopping shall be preformed by a applicator/installer qualified and trained by the manufacturer. Installation shall be preformed in strict accordance with manufacturer's detailed installation procedures.
 - 2. Apply firestopping in accordance with fire test reports, fire resistance requirements, acceptable sample installations, and manufacturer's recommendations.
 - 3. Coordinate with plumbing, mechanical, electrical and other trades to assure that all pipe, conduit, cable and other items which penetrate fire-rated construction have been permanently installed prior to installation of firestopping. Schedule and sequence the work to assure that partitions and other construction which would conceal penetrations are not erected prior to the installation of firestopping.
 - 4. Unless specified and approved, all insulations used in conjunction with through-penetrants shall remain intact and undamaged and may not be removed.
- B. Dam Construction:
 - When required to properly contain firestopping materials within openings, damming or packing materials may be utilized. Combustible damming material must be removed after appropriate curing. Noncombustible damming materials may be left as permanent component of the firestopping system.
- C. Field Quality Control:
 - 1. Prepare and install firestopping systems in accordance with manufacturer's printed instructions and recommendations.
 - 2. Follow safety procedures recommended in the Material Safety Data Sheets.
 - 3. Finish surfaces of firestopping which are to remain exposed in the completed work to a uniform and level condition.
 - 4. All areas of work must be accessible until inspection by the applicable Code Authorities.
 - 5. Correct unacceptable firestops and provide additional inspection to verify compliance with this specification at no additional cost.

3.04 CLEANING

- 1. Removing spilled and excess materials adjacent to firestopping without damaging adjacent surfaces.
- 2. Leave finished work in neat, clean condition with no evidence of spillovers or damage to adjacent surfaces.

SUBMITTAL CHECKLIST

- 1. Manufacturer's Data Sheets.
- 2 Shop Drawings.
- 3. UL Test Data.

END OF SECTION 07840

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The extent of each form and type of joint sealer as indicated on the Drawings and specified herein.

- B. Types of joint sealants specified herein include:
 - 1. Elastomeric Sealants.
 - 2. Non-Elastomeric Sealants and Caulking Compounds.
 - 3. Acoustical Sealants.
 - 4. Acoustical Duct Gaskets.
 - 5. Waterstop.
- C. In general, all joints are to have joint sealers, including but not limited to the following:
 - 1. Sidewalk Joints.
 - 2. Expansion and control joints.
 - 3. Flashing and coping joints.
 - 4. Interior wall/ceiling/door/window frame joints.
 - 5. Joints between dissimilar materials.
 - 6. Acoustical partition walls joints and entire perimeter.
 - 7. Mechanical ducts through acoustical partition walls.
 - 8. Concrete joints and penetrations at elevator pit below grade.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Refer to Division 3 concrete surfaces.
- B. Refer to Division 8 sections for glazing requirements.
- C. Refer to sections of Division 15 and 16 for joint sealers in mechanical and electrical work.

1.03 QUALITY ASSURANCE

A. Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.04 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Submit manufacturer's product specifications, handling/installation/curing instructions and performance tested data sheets for each elastomeric product required.
 - 2. Submit certified test reports for elastomeric sealants on aged performances as specified, including hardness, stain resistance, adhesion, cohesion or tensile strength, elongation, low-temperature flexibility, compression set, modulus of elasticity, water absorption, and resistance (aging, weight loss, deterioration) to heat and exposures to ozone and ultraviolet light.
- B. Samples:
 - 1. Submit color charts for selection.
 - 2. Colors to be selected by Architect from manufacturer's entire selection.
 - 3. Multiple colors may be selected for differing substrates and/or conditions throughout the project.

1.05 JOB CONDITIONS

A. Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.

1.06 WARRANTY

A. The Contractor shall provide a warranty against failure of sealant materials and workmanship including replacement of other materials damaged as a result of sealant failure for five (5) years from the date of Substantial Completion. Typical for all sealants at all locations and conditions, unless otherwise indicated.

PART 2 - PRODUCTS

2.01 <u>GENERAL</u>

- A. General Sealer Requirements:
 - 1. Select materials for compatibility with joint surfaces and other indicated exposures, and except as otherwise indicated, select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated.
 - 2. Where exposed to foot traffic, select non-tracking materials of sufficient strength and hardness to withstand "stiletto" heel traffic without damage or deterioration of sealer system.
 - 3. Provide colors as selected by Architect from the manufacturer's entire available color selection. Colors are to be selected for each differing material and condition. Various colors of each product are to be expected.

2.02 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, by one of the following approved manufacturers:
 - 1. Manufacturers of Elastomeric Sealants (Liquid):
 - a. "Sonneborn / BASF Building Systems"
 - b. "Tremco, Inc."
 - c. "Capital Services"
 - d. "DOW Corning"
 - 2. Manufacturers of Non-Elastomeric Sealants (Liquid/Tape):
 - a. "Sonneborn / BASF Building Systems"
 - b. "Tremco, Inc."
 - c. "Capital Services"
 - d. "DOW Corning"
 - 3. Manufacturers of Joint Fillers/Sealant Backers:
 - a. "Sonneborn / BASF Building Systems"
 - b. "Backer Rod Mfr. & Supply Co."
 - c. "Williams Products, Inc."
 - 4. Manufacturers of Waterstop:
 - a. "Volclay"

2.03 ELASTOMERIC SEALANTS

- A. For use at interior/exterior joints subject to movement: control joints, expansion joints, etc.
- B. Multi-Component Polyurethane Sealant: Except as otherwise indicated, provide manufacturer's standard, non-modified, 2-or-more-part, polyurethane-base, elastomeric sealant; complying with ASTM C920 Type M Class 25, non-sag grade/type.

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- C. Modulus and Hardness: Where self-leveling grade/type is required, provide sealant with cured modulus of elasticity at 100% elongation of not more than 150 psi (ASTM D 412 test procedure), and Shore A hardness of not less than 55 (ASTM D 2240). Where non-sag grade/type is required, provide sealant with cured modulus of elasticity at 100% elongation of not more than 75 psi and Shore A hardness of 20 to 30.
- D. Tear Resistance: Not less than 50 lb. per inch (ASTM D 624).
- E. Acceptable Products:
 - 1. "Sonneborn", Sonolastic NP 1.
 - 2. "Sonneborn", Sonolastic NP 2.
 - 3. "Sonneborn", Sonolastic SL I.
 - 4. "Tremco", Dymeric.

2.04 NON-ELASTOMERIC SEALANTS AND CAULKING COMPOUNDS

- A. For general use as an exposed building construction sealant provide acrylic terpolymer, solvent-based, one-part, thermo-plastic sealant compound; solids not less than 95% acrylic.
- B. Performance Standard: Comply with either ASTM C 920 Type S Class 12-1/2 Grade NS or Class B Type Non-Sag.
- C. Bond and Cohesion: Comply with ASTM C 910, with less than 0.50 square inches of combined cohesion and bond failure for three (3) samples.
- D. Acceptable Products:
 - 1. "Sonneborn", Sonolac.
 - 2. "Tremco", Mono.

2.05 MISCELLANEOUS MATERIALS

A. Joint Primer/Sealer:

Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

B. Bond Breaker Tape:

Provide Polyethylene tape or other plastic tape as recommended by sealant manufacturer; to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.

C. Sealant Backer Rod:

Provide compressible rod stock of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended by sealant manufacturer for back-up of, and compatibility with sealant.

2.06 ACOUSTICAL SEALANTS

A. Description:

- 1. Sealant engineered for acoustical isolation in partition walls.
- 2. Non-hardening, non-cracking, non-skinning.
- 3. One-component butyl sealant.
- B. Performance:
 - 1. Flexibility:

Comply with ASTM C-711-72 for no cracking or loss of adhesion.

- 2. Weatherability: Comply with ASTM D750-68 for no cracking, bleeding or loss of rubber characteristics.
- C. Installation:
 - 1. Install at the following locations and conditions in all interior acoustical partition walls, whether specifically indicated or not on the drawings:
 - a. All perimeter joints of overall wall surface to adjacent construction.
 - b. All joints between individual wall panels.
 - c. All perimeter surfaces of items penetrating the wall surfaces.
 - d. All small openings or penetrations through wall surfaces.
 - e. Bedding all electrical receptacle and switch boxes into wall surface.
 - f. Along all edges of stud wall bottom plate to floor, both sides of wall, prior to install of wallboard.
 - g. Along all edges of stud wall top plate to ceiling or structure, both sides of wall, prior to install of wallboard.
- D. Acceptable Products:
 - 1. "QuietSeal", QS-350.
 - 2. "Titebond", Acoustical Sound Sealant.
 - 3. "Grabber", Acoustical Sealant GSCS.
 - 4. "Lapage", PL Acousti-Seal.

2.07 ACOUSTICAL DUCT GASKET

- A. Description:
 - 1. Flexible vinyl sheet bonded to a layer of reinforced aluminum foil on both faces engineered to reduce sound transmission where installed.
 - 2. 0.10" (3mm) thick barium sulphate vinyl sheet.
 - 3. Nominal density of 1.0 lbs/sf.
 - 4. Minimum sound transmission loss STC=26.
- B. Installation:
 - 1. Install at all mechanical duct penetrations through all interior acoustical partition walls, whether specifically indicated or not on the drawings:
 - 2. Wrap a single layer of material around the entire perimeter of the duct surface to form a complete barrier on surface through the entire wall thickness.
 - Material should carry continuously through the entire wall penetration. Continue material on ductwork a minimum of 48" from the wall surface, both sides of wall where possible. Where not possible, end material edge flush with finished surface on front face side of wall.
 - 4. Install additional layers of material through the entire wall thickness as required to completely infill the penetration void so as to create a tight gasket around ductwork through the wall penetration.
- C. Acceptable Products:
 - 1. "Kinetics Noise Control", #KNM-100AL/AL, Cross Talk Barrier Material.

2.08 WATERSTOP

A. Description:

- 1. Waterstop for use on exterior vertical and horizontal joints and penetrations through concrete.
- 2. Flexible, active, swelling waterstop to provide a positive seal upon contact with water.
- 3. Consists of 75% sodium bentonite and 25% butyl rubber compound.
- 4. Performance standards to comply with ANSI/NSF 61.

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- B. Protection of concrete joints and penetrations:
 - 1. Install to form a continuous waterstop along entire joint or perimeter of penetration.
 - 2. Adhere to concrete with manufacturer's adhesive.
- C. Acceptable Products: 1. "Volclay", Waterstop-RX.

PART 3 - EXECUTION

3.01 PREPARATION

A. Examine substrates, (joint surfaces) and conditions under which joint sealer work is to be performed. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Clean joint surfaces immediately before installation of sealants. Remove dirt, insecure coating, moisture and other substrates which could interfere with bond of sealant. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.
- B. Set joint filler units at depth or position in joint as indicated to coordinate with other work, including installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between ends of joint filler units.
- C. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated. Install backer rod at all areas required for proper installation of sealant.
- D. Install backer rods at any location necessary for proper installation of all sealants, whether shown on drawings or not.
- E. Install bond breaker tape where indicated and where required by manufacturer's recommendations to insure that liquid-applied sealants will perform as intended.
- F. Employ only proven installation techniques, which will insure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill joints with sealant to a slightly concave surface slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surfaces, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- G. Install liquid applied sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations:
 - 1. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2 inch deep nor less than 1/4 inch deep.
 - 2. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in range of 75% to 125% of joint width.
- H. Do not allow sealants or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.
- I. Do not overheat or reheat hot-applied sealants.

JOINT SEALERS

3.03 PROTECTION

- A. Cure sealant compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.
- B. Protect joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Replace or restore sealants which are damaged or deteriorated during construction period.

SUBMITTAL CHECK LIST

- 1. Product Data.
- 2. Warranty.

END OF SECTION 07900

SECTION 08110 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Hollow metal doors and frames as shown on the Drawings and specified herein, including:
 - 1. Hollow steel doors and frames.
 - 2. Hollow steel frames for wood doors.
 - 3. Heavy duty steel traffic doors and frames.
 - 4. Hollow metal window-walls, glazed openings, and other hollow metal frames for glass.
 - 5. Rough bucks, frame reinforcing, door reinforcing, door insulation, closer reinforcements, clip angles and anchorage.
 - 6. Factory prime paint finish.
 - 7. Grouting of hollow metal frames with masonry mortar where not covered under other Sections.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 03300 - Cast-In-Place Concrete.

- Section 04220 Concrete Unit Masonry.
- Section 06100 Rough Carpentry.
- Section 08211 Flush Wood Doors.
- Section 08710 Finish Hardware.
- Section 08800 Glass and Glazing.
- Section 09900 Painting.

1.03 <u>REFERENCES</u>

- A. The following standards, tests and publications may be referred to herein and are applicable to this Section:
 - 1. ANSI A250.8-1998/SDI-100 Recommended Specifications Standard Steel Doors and , Steel Door Institute, unless herein specified.
 - 2. UL 10C-98 and UBC 7-2 Positive Pressure Fire Tests of Door Assemblies.
 - 3. NFPA-80-1999 Standard for Fire Doors and Windows.
 - 4. NFPA-101-1997 Life Safety Code.
 - 5. NFPA-105 Standard for Smoke and Draft Control Assemblies.
 - 6. ASTM-A 366-95A Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
 - 7. ASTM-A 568-95 Specification for Steel, Sheet, Carbon, and High Strength, Low-Alloy, Hot-Rolled, and Cold-Rolled.
 - 8. ASTM-A 569-91a Specification for Steel, Carbon, (0.15 maximum percent), Hot-Rolled Sheet and Strip Commercial Quality.
 - 9. ASTM-A 924-95 General Requirements for Steel Sheet, Metallic Coated by the Hot-Dip Process.
 - 10. SDI-105-92 Recommended Erection Instructions for Steel Frames.
 - 11. ANSI A115.1-.18 Specification for Door and Frame Preparation for Hardware.
 - 12. ANSI A156.7 Standard Template Hinge Dimensions.

1.04 SUBMITTALS

A. Product Data:

- 1. Manufacturer's specifications for fabrication and installation, including data substantiating products comply with requirements.
- 2. Manufacturer's published product data sheets.

B. Shop Drawings:

- 1. Show type of door and frame for each opening, sections of all typical members, dimensioned elevations, anchors, reinforcements and other required components.
- 2. Preparation for installing hardware and glazing.

1.05 QUALITY ASSURANCE

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
- B. Wind Load Performance Requirements: Comply with wind load requirements of the applicable State Building Code. Deflection shall not exceed 1/175 of span.
- C. Supplier Qualification: Qualified direct distributor of products to be furnished. The distributor shall have in their regular employment an A.H.C./C.D.C. or person of equivalent experience who will be available at reasonable times to consult with the Architect, Contractor and/or Owner regarding any matters affecting the total door and frame openings.
- D. Installer Qualification: Experience with installation of similar materials.
- E. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated or required, provide fire-rated door and frame assemblies that comply with NFPA 80 "Standard for Fire Doors and Windows", and have been tested, listed, and labeled in accordance with ASTM E152 "Standard Methods of Fire Tests of Door Assemblies" by nationally recognized independent testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Oversize Fire-Rated Door Assemblies: For door assemblies required to be fire-rated and exceeding sizes of tested assemblies, provide certificate or label from approved independent testing and inspection agency, indicating that door and frame assembly conforms to requirements of design, materials and construction as established by individual listings for tested assemblies.
 - 2. Temperature Rise Rating: At stairwell enclosures, provide doors which have Temperature Rise Rating of 450 degrees F maximum in 30 minutes of fire exposure.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store doors and frames at the job site in such a manner as to prevent damage.
- B. Remove all damaged or otherwise unsuitable doors and frames.
- C. Deliver hollow metal doors in manufacturer's protective covering. Handle hollow metal with care to prevent damage.
- D. Door Storage: Store doors in upright position, under cover. Place doors on at least 4 inch high wood sills or on floors in manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chamber and promote rusting. If corrugated wrapper on door becomes wet, or moisture appears, remove wrapping immediately. Provide 1/4 inch space between doors to promote air circulation.
- E. Frame Storage: Store frames under cover on 4 inch wood sills on floors in manner that will prevent rust and damage. Do not use non-vented plastic or canvas shelters which create humidity chamber and promote rusting. Store assembled frames in vertical position, 5 units maximum in stack. Provide 1/4 inch space between frames to promote air circulation.
- F. Deliver doors and frames to the jobsite in stages or shipments as required for phasing, and in a timely manner so as not to delay progress of other trades.

PART 2 - PRODUCTS

Α

2.01 ACCEPTABLE MANUFACTURERS:

- Provide products, as approved by the Architect, by one of the following acceptable manufacturers:
 - 1. Atlas Companies.
 - 2. CECO Door Products.
 - 3. Curries.
 - 4. Deansteel Manufacturing Company, Inc.
 - 5. Fenestra.
 - 6. Kewanee Corporation.
 - 7. Mesker.
 - 8. Metal Products.
 - 9. Pioneer Industries, Inc.
 - 10. Republic Builders Products.
 - 11. Steelcraft Manufacturing Company.

2.02 MATERIALS

- A. Cold-Rolled Steel Sheets:
 - 1. Commercial quality, stretcher leveled flatness, cold-rolled steel, free from scale, pitting or other surface defects.
 - 2. Complying with ASTM A 366 and ASTM A568.
- B. Galvanealed Steel Sheets:
 - 1. ASTM A924, A60 zinc coating.
 - 2. Use galvanealed steel sheets at the following locations, whether indicated or not:
 - a. All exterior doors and door frames.
 - b. All doors and frames in kitchens, locker rooms and restrooms.
 - c. All doors and frames in any other area that is exposed to moisture for long periods of time.
 - d. All door louvers and other components within doors that require galvanealed steel sheets.
 - 3. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM-A569.
- C. Supports and Anchors:
 - 1. Fabricate of not less than 16 gauge galvanized sheet steel.
 - 2. Provide all blocking, backings and supports in all horizontal and vertical members as required for reinforcing of all door hardware as specified in Section 08710.
- D. Inserts, Bolts and Fasteners:
 - 1. Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls.
- E. Drip Cap:
 - 1. On all exterior door bottoms.
 - 2. On all exterior door frame heads.
- F. Primer:
 - 1. For steel surfaces, use rust-inhibitive zinc oxide primer suitable as a base for specified finish paints.

2.03 <u>FABRICATION</u>

- A. General:
 - 1. Fabricate hollow metal work to be rigid, neat in appearance and free from defects, warp, or buckle.
 - 2. Accurately form metal to required sizes and profiles.
 - 3. Weld exposed joints continuously; grind and dress smooth.
 - 4. Provide doors and frames bearing UL labels as scheduled. Construction similar to specified hollow metal work, modified to meet Underwrites Laboratories, Inc. requirements.
- B. Galvanealed Steel Sheets:
 - 1. ASTM A924, A60 zinc coating.
 - 2. Internal reinforcing may be manufactured of hot rolled pickled and oiled steel per ASTM-A569.
- C. Minimum Gauges of Hollow Metal:
 - 1. Frames:
 - a. 16 gauge: Interior door frames.
 - b. 16 gauge: Typical labeled interior frames.
 - c. 16 gauge: Interior glazed window and opening frames.
 - d. 14 gauge: Exterior door frames.
 - e. 14 gauge: Typical labeled exterior frames.
 - f. 14 gauge: Exterior glazed window and opening frames.
 - 2. Doors:
 - a. 18 gauge: Interior doors.
 - b. 18 gauge: Typical labeled interior doors.
 - c. 16 gauge: Exterior doors.
 - d. 16 gauge: Typical labeled exterior doors.
 - 3. Accessories:
 - a. 20 gauge: Trim members.
 - 4. Provide heavier gauges at doors, frames and accessories as required by fire rating label, details or specific condition.
 - 5. Entire frame, sidelight and transom unit shall be of the same gauge.
- D. Doors:
 - 1. Form face sheets in smooth seamless unbroken surface. Construct doors with smooth flush surfaces, without visible joints or seams on exposed faces or stile edges. Interior and exterior door edge seams shall be full height wire welded and ground smooth.
 - 2. Reinforce, stiffen and sound deaden.
 - 3. Stiffen face sheet with 20 gauge steel stiffener reinforced vertically, full height and width, spot welded to both face sheets. Stiffeners welded together top and bottom.
 - 4. Close top and bottom edges of interior and exterior doors with continuous recessed flush steel channel minimum 16 gauge, extending full width of door, and spot welded to both faces. Provide drain holes in bottom closure of exterior doors.
 - 5. Frame openings for glazing and provide cut-outs for glass and louvers with stops as shown. Form beads of 20 gauge steel; locate on inside of opening.
 - 6. Insulate core of all exterior doors, whether indicated or not, and interior doors where indicated:
 - a. Insulate with 1 lb minimum density insulation.
 - b. Minimum insulation value R-2 minimum.
 - 7. Labeled Doors: Insulate as required by Underwriters Laboratories. Build in special hardware and provide astragals as indicated. At one hour and at 1-1/2 hour doors at enclosures, maximum transmitted temperature end point shall not exceed 450 degrees F above ambient at end of 30 minutes of fire exposure per U.L.

- 8. Exterior Hollow Metal Door Louvers: Fabricate louver units of 16-gauge galvanized steel sheets with stationary, weatherproof Z-shaped blades and U-shaped frames, not less than 1-3/8 inch thick. Space louver blades not more than 1-1/2 inch o.c. Assemble units by welding. Provide insect screen on interior side of frame, consisting of 14 by 18 wire mesh in rigid, formed metal frame.
- 9. Interior Hollow Metal Door Louvers: Fabricate of 20-gauge cold-rolled steel sheets with stationary sightproof inverted V-shaped blades and U-shaped frames. Space louver blades not more than 3 inches o.c. Assemble units by welding.
- 10. Typical Reinforcement: Provide as required for hardware items. For lock reinforcement, provide manufacturer's standard reinforcement. Provide 12 gauge reinforcement for escutcheons or roses. centering clips to hold lock case in alignment. For door checks, provide 14 gauge channel type reinforcements, 3-1/2 inch deep by 14 inches long, or as required. Hinge reinforcement to be one piece 14 gauge continuous channel welded to the door. Reinforce doors for surface items such as surface and semi-concealed closers, brackets, surface holders and door stops. Drilling and tapping installation of these surface items shall be done in field by hardware installer.
- 11. Provide to design indicated including: Flush panel doors, flush panel with cut-out as indicated, stile and rail type, stile and rail with door louver.
- 12. Finish: Provide prime coat finish on doors. Thoroughly clean off rust, grease and other impurities. Grind welds smooth, no marks shall show. Apply metallic filler as required to fill cracks and joints and to level any weld areas or similar imperfections. Sand filler coat smooth.
- 13. All exterior metal doors to be Galvanealed Steel Sheets.
- E. Frames:
 - 1. Welded Frames. Knockdown frames not permitted, except where specifically indicated by Architect.
 - 2. Close corner joints tight with trim faces mitered and continuously welded, ground smooth.
 - 3. Provide dust cover boxes for hinge and strike plate cutouts and at all other hardware mortises.
 - 4. Weld temporary steel spreader to feet of both jambs, or strap pairs with heads inverted, as bracing during shipping and handling.
 - 5. Rated frames where indicated on drawings and at all rated door openings.
 - 6. At masonry, provide wire or masonry "T" anchors approximately 24 inches on center.
 - 7. Provide and secure galvanized steel drip cap at all exterior doors, field painted to match frame.
 - 8. Silencers: Provide specified silencers, except where stop does not occur and at smoke gasketed openings, 3 per jamb at single door and one for each door at double doors.
 - 9. Extensions: Reinforce transom bars or mullions as necessary to provide rigid installation. Where required (as at multiple openings) to stabilize large frames, provide frame or mullion extensions to anchor to structure above, proper size to fit within overhead construction. Provide angle clips to fasten to structure.
 - 10. Mullions: Provide mullions, straight and without twist, of tubular design. No visible seams will be accepted. For removable mullions provide reinforcing at frame head.
 - 11. Clearances: Provide and be responsible for proper clearances at metal frames, including for weatherstripping, soundstripping and smoke gasketing. Glass clearance shall be thickness of glass plus clearance each side (1/8 inch minimum exterior 1/16 inch minimum interior), adjust for installation, glass thickness to allow for glazing and sealant. Where sealed double glazing is indicated, provide rebates minimum of 3/4 inch and provide 1/4 inch clearance at glass edges. Where units fit around concrete blocks (blocks built into frames) obtain actual dimensions of blocks being used to establish minimum clearances.
 - 12. Stops: Set with countersunk or Jackson head screws.
 - 13. Labeled Frames: Construct in accordance with requirements for labeled work. Attach proper U.L. label, Warnok Hersey. "B" labeled frames shall be 1-1/2 hour construction.
 - 14. Joinings: Furnish frames mitered, or coped, and continuously face welded. Grind smooth, and conceal joints for a seamless appearance. Touch up welded surfaces with manufacturer's standard prime paint.

- 15. Workmanship: Fabricate so no grind marks, hollow or other out-of-plane areas are visible. At joints of intermediate members (such as mullions and transom bars), provide tight joining, neatly accomplished without holes, burned out spots, weld build up or other defacing work. Fill to close cracks and to preserve shapes. Tightly fit loose stops, to hairline joints.
- 16. Finish: Clean frames by degreasing process and apply thorough coating of baked-on primer, covering inside as well as outside surfaces. At galvanealed frames, coat welds and other disrupted surface with zinc-rich paint containing not less than 90 percent zinc dust by weight.
- 17. All exterior metal frames to be Galvanealed Steel Sheets.
- F. Hardware Preparation:
 - 1. Mortise, reinforce, drill and tap doors and frames for mortised hardware.
 - 2. Prepare strike jamb for 3 silencers on door side.
 - 3. Typical Reinforcing: Provide minimum hinge reinforcement 3/16 inch by 1-1/2 inch by 10 inch. Provide similar reinforcement for hardware items as required to adequately withstand stresses, minimum 12 gauge, including channel reinforcement for door closers and closer arms, door holders and similar items. Provide reinforcement and clearances for concealed in-head door closers and for mortise locks, where applicable.
 - 4. Anchorage: Provide standard and special anchorage items as required.
 - 5. Cover Plates: For hinge and strike plate cutouts, provide fully enclosed pressed steel cover boxes spot welded to frames behind mortises.
- G. Finish:
 - 1. Chemically treat and apply manufacturer's standard rust inhibitive primer coat conforming to ANSI A224.1-1990.
 - 2. Coat interior of frame with bituminous paint, minimum 1.5 mils.
 - 3. Prep surfaces to receive finish painting in the field.
- H. Fastenings:
 - 1. Provide fastenings, anchors and clips as required to secure hollow metal work in place.
 - 2. Provide Jackson head screws, or flatter.
 - 3. Dimple metal work to receive screw heads.
 - 4. Set stops and other non-structural fastenings with #6 Jackson head self-tapping screws.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine supporting structure and conditions under which hollow metal is to be installed.
- B. Verify that frame opening corresponds to dimensions of frames furnished.
- C. Check that surfaces to contact frames are free of debris.
- D. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 INSTALLATION

- A. General:
 - 1. Install in accordance with reviewed shop drawings and manufacturer's printed instructions.
 - 2. Set hollow metal plumb, level, square to proper elevations, true to line and eye.
 - 3. Units and trim shall be fastened tightly together, with neat, uniform and tight joints.
- B. Anchorage:
 - 1. Attach anchors to opening.
 - 2. Minimum number of anchors: 3 per jamb.
 - 3. Securely fasten and anchor work in place without twists, warps, bulges or other unsatisfactory or defacing workmanship.

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- 4. Set clips and other anchors with Ramset "shot" anchors or drill in anchors as approved.
- C. Frames:
 - 1. Attach frames true to line with adjacent construction.
 - 2. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.
 - 3. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
 - 4. At cast-in-place concrete or masonry construction, set frames and secure in place using countersunk bolts and expansion shields, with bolt heads neatly filled with metallic putty, ground smooth and primed.
- D. Doors:

3.

- 1. Hang doors square to opening.
- 2. Minimum Clearances:
 - a. At head and jambs: 1/8".
 - b. Between meetings edges of pairs of doors: 1/8".
 - c. With Floor: 3/4", except 3/8" undercut at handicap accessible doors.
 - d. At Threshold: 1/4".
 - e. At Handicap Threshold: As required to coordinate with threshold height.
 - Fit hollow metal doors accurately in their respective frames, within following clearances:
 - a. Jambs and head 3/32 inch.
 - b. Meeting edges pair of doors 1/8 inch.
 - c. Sill where no threshold or carpet 1/4 inch above finished floor.
 - d. Sill at threshold 3/4 inch maximum above finished floor.
 - e. Sill at carpet 1/4 inch above carpet.
- E. Labeled Doors and Frames:
 - 1. Install in conformance with NFPA Standard 80.
 - 2. Provide clearances in conformance with NFPA Standard 80.
- F. Special elevator machine room door requirements:
 - 1. Machine room and machine space doors to meet code compliant fire resistive construction. When a machine room is used, provide a self closing (local building code dependent) and self locking door with a group 2 locking device. When a machine space is used, provide a standard 3' x 7' self closing (local building code dependent) and self locking metal door with a group 2 locking device in the hoistway per Otis layout. In addition, ensure that all air gaps around the machine room/machine space door are sealed (i.e. threshold, weather stripping, etc). Self closing mechanism cannot protrude into the machine space at any time. The machine space door lever shall have a blank plate on the hoistway side of the door.

3.03 ADJUST AND CLEAN

- A. Remove dirt and excess sealants from metal surfaces.
- B. Touch up marred or abraded surfaces.
- C. Lubricate hardware and adjust moving parts to operate smoothly.
- D. Remove debris from work area.

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- E. Prime Coat Touch-Up: Modify existing doors and frames to receive new door hardware. Cut, patch, weld, bondo, and sand smooth, modified areas. Modifications will be seamless and not noticeable. Use compatible air-drying primer.
- F. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

SUBMITTAL CHECKLIST

- 1. Product Data.
- 2. Shop Drawings.

END OF SECTION 08110

SECTION 08211 - FLUSH WOOD DOORS

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Interior flush pre-fit, pre-machined standard and fire rated type wood doors as shown on the Drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 06200 - Finish Carpentry. Section 08110 - Steel Doors and Frames. Section 08710 - Finish Hardware. Section 08800 - Glass and Glazing. Section 09900 - Painting.
- 1.03 <u>REFERENCES</u>
 - A. WDMA Window and Door Manufacturers Association: IS 1-A 1997 Industry Standard for Architectural Flush Wood Doors.
 - B. NFPA-80: Standards for Fire Doors 1999 Edition.
 - C. Uniform Building Code: UBC 7-2 1997 or UL10C, Positive Pressure Fire Door Assemblies. Category "B" for single swing doors and Category "A" for pairs of swinging doors.
 - D. NFPA-105: Recommended Practice for Installation of Smoke-Control Door Assemblies, 1999 Edition.
 - E. NFPA-252: Standard Method of Fire Tests for Door Assemblies.
 - F. UL: Building Materials Directory.
 - G. WHI: Directory of Listed Products.
 - H. ICC/ANSI-A117.1-2003: Accessible and Usable Buildings and Facilities.
 - I. State and Local Building Codes including the Authority Having Jurisdiction.

1.04 QUALITY ASSURANCE

- A. Except as otherwise specified herein, wood doors shall conform with Architectural Woodwork Institute (AWI) Quality Standards and National Woodwork Manufacturer's Association (NWMA) I.S. 1 and I.S. 2.
- B. Fire-Rated Wood Doors: Provide wood doors which are identical in materials and construction to units tested in door and frame assemblies in accordance with UBC 7-2 1997 or UL10c, Positive Pressure Fire Door Test Method, and which are labeled and listed for ratings indicated by ITS Warnock Hersey, UL or other testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Doors: Comply with UBC 7-2 1997 or UL10C where required.
 - Provide smoke gaskets or fire seals as required by manufacturers' individual authorities in compliance with UBC 7-2 1997 or UL-10C-1998.
 - 3. Maintain one copy of each compliance document on the project site.
 - 4. Fabrication of doors shall permit installation in accordance with NFPA Standard No. 80.
 - 5. Fire doors to be rated UL10C Positive Pressure Category A.

- C. WDMA I.S. 1-A 2004 Quality Standard: Window and Door Manufacturers Association Quality Standards for grade of door, core, construction, finish, and other requirements.
- D. Temperature Rise Rating: At stairwell enclosures, provide doors which have Temperature Rise Rating of 250 degrees F maximum in 30 minutes of fire exposure.
- E. Manufacturer must have qualifications specializing in the manufacturing of the products specified in this Section for a period of not less than 10 years.

1.05 <u>SUBMITTALS</u>

- A. Manufacturer's Literature:
 - 1. Manufacturer's published catalog data, product data sheets and cutsheets.
 - 2. Certificate of compliance with NWMA I.S. 1.
 - 3. Indicate general construction, jointing methods, hardware and louver locations, locations of cut-outs for glass, thickness of veneers, materials, door swings, special blocking, stile and rail dimensions, undercuts, and storage and installation details. Do not proceed with any fabrication until all details are approved.
- B. Shop Drawings:
 - 1. Show elevations, dimensions, construction details, glazing, cut-outs and label.
- C. Samples:
 - 1. Actual samples of wood veneer and finish.
 - 2. Stain colors and finishes to be selected from manufacturer's entire standard selection.
 - 3. If stains are required to be custom matched, submit samples of actual finished product, along with sample of item door was to be matched to.
- D. Warranty:
 - 1. Manufacturer's standard warranty for materials.
 - 2. Special Warranty as specified herein.
- E. Certification:
 - 1. Submit any information necessary to indicate compliance to all of these specifications.
 - 2. All labeled fire door assemblies to be of a type which have been classified and listed in accordance with the latest edition of NFPA 80 and tested in compliance with NFPA-252, and UL-10B, and UBC-7-2.
 - 3. A metal label is to be permanently affixed to the fire door at an authorized facility. Furthermore, all, 45, 60, and 90 minute labeled fire doors, are to have manufacturer's standard laminated stiles for improved screw holding and split resistance capabilities.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver doors to the site until building has been closed in and is thoroughly dry.
- B. Deliver pre-finished wood doors to jobsite after all door frames have been painted, and all "wet" construction has been completed.
- C. Plastic wrap and protect wood doors during transit, storage and handling, to prevent damage, soiling or deterioration. Follow the Care and Installation guidelines as described in WDMA I.S. 1-A 2004.
- D. Store doors flat and protect from damage.

- E. Do not walk or stack any materials on top of any wood doors delivered to the jobsite, and do not drag any wood doors across each other during delivery or installation.
- F. Remove damaged or otherwise unsuitable doors from the job site.

1.07 SPECIAL WARRANTY

- A. The Contractor shall warrant the wood doors to be free of faults and defects for the life of the installation.
- B. Faults and Defects:
 - 1. Delamination in any degree.
 - 2. Warp or twist of 1/4" or more, in any 7'-0" plane, in any direction.
 - 3. Telegraphing of stile, rail, or core, through the face of the door to cause surface variation in excess of 1/100" in any 3" span.
 - 4. Any other defect that shall affect the operation of the door, shall be considered a defect under the provision of the warranty.
- C. Warranty to include refinishing and reinstallation that may be required due to repair or replacement of any defective doors.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, by one of the following acceptable manufacturers:
 - 1. Algoma Hardwoods.
 - 2. Chappell.
 - 3. Eggers Industries.
 - 4. Graham Manufacturing.
 - 5. Ideal Wood Products.
 - 6. Marshfield Door Systems.
 - 7. Mohawk Flush Doors.
 - 8. Ohio Valley.
 - 9. Oshkosh.
 - 10. VT Industries.

2.02 FABRICATION

Α.

- Typical Doors, Non-Fire Rated:
 - 1. Thickness: 1-3/4 inches.
 - 2. Interior flush, bonded, solid core, hardwood veneered.
 - 3. Door construction shall conform to WDMA I.S. 1-A 2004 Premium Grade and AWI Quality Standards Premium Grade.
 - 4. Core: bonded particle core (PC).
 - a. Solid particleboard bonded to the stiles and rails.
 - b. Comply with ANSI-A208-1 Grade 1-LD-2.
 - 5. Vertical Stiles: Hardwood to match face veneer, 1-3/8" minimum before trimming, over structural composite lumber (SCL), glued to core.
 - 6. Rails: Mill option hardwood or SCL. Top and bottom: 2 inches before trimming.
 - 7. Facing: Wood veneer cut and species as specified shall conform to WDMA I.S. 1-A 2004 "A" grade for Premium Grade Door Construction requirements.
 - 8. Crossbands: Hardwood, 1/16 inches thick, extending full width of door.
 - 9. Edge Bands: Same species as face veneer, matched for color.

- B. Fire Rated Doors (20 Minute Rating):
 - 1. Thickness: 1-3/4 inches.
 - 2. Interior flush, bonded, solid core, hardwood veneered.
 - 3. Door construction shall conform to WDMA I.S. 1-A 2004 Premium Grade and AWI Quality Standards Premium Grade.
 - 4. Core: bonded particle core (PC).
 - a. Solid particleboard bonded to the stiles and rails.
 - b. Comply with ANSI-A208-1 Grade 1-LD-2.
 - 5. Vertical Stiles: Hardwood to match face veneer, 1-3/8" minimum before trimming, over structural composite lumber (SCL), glued to core.
 - 6. Rails: Mill option hardwood or SCL. Top and bottom: 2 inches before trimming.
 - 7. Facing: Wood veneer cut and species as specified shall conform to WDMA I.S. 1-A 2004 "A" grade for Premium Grade Door Construction requirements.
 - 8. Crossbands: Hardwood, 1/16 inches thick, extending full width of door.
 - 9. Edge Bands: Same species as face veneer, matched for color.
- C. Fire Rated Doors (45 Minute Rating and Higher):
 - 1. Thickness: 1-3/4 inches.
 - 2. Interior flush, bonded, solid core, hardwood veneered.
 - 3. Door construction shall conform to WDMA I.S. 1-A 2004 Premium Grade and AWI Quality Standards Premium Grade.
 - 4. Core: bonded mineral core (FD).
 - a. Non-combustible mineral core containing no asbestos.
 - 5. Vertical Stiles: Laminated hardwood to match face veneer over mineral composite, glued to core, and laminated prior to field fitting.
 - 6. Rails: Fire-rated mineral composite materials (Firestop), as required by fire door authorities. Top and bottom: thickness before trimming as required by manufacturer's fire door authorities. Meet requirements and testing for labeled rating.
 - 7. Facing: Wood veneer cut and species as specified shall conform to WDMA I.S. 1-A 2004 "A" grade for Premium Grade Door Construction requirements.
 - 8. Crossbands: Hardwood, 1/16 inches thick, extending full width of door.
 - 9. Edge Bands: Same species as face veneer, matched for color.
- D. Wood Transom Panels:
 - 1. Provide continuous sequence of veneer between transom panel and adjoining door using same width of veneer pieces on adjoining requirements for veneer quality and matching.
 - 2. Label doors and transoms to show door assembly match relationships specified.
- E. Provide all blocking, backings and supports in all horizontal and vertical members as required for reinforcing of all door hardware as specified in Section 08710.

2.03 WOOD VENEER

- A. Face Veneer:
 - 1. Shall meet quality standards conforming to WDMA I.S. 1-A 2004 "A" grade for transparent finish.
 - 2. Minimum face veneer thickness shall be 1/50" after finish sanding.
 - 3. Wood Species: Select Red Oak.
 - 4. Face Cut: Plain Sliced cut, as selected by Architect.
 - 5. Face Assembly: Book Match.
 - 6. Face Symmetry: Running Match.

2.04 <u>VISION FRAMES</u>

- A. Non-Rated Doors:
 - 1. Flush bead wood frames, 1/2" thickness.
 - 2. Hardwood of same species as face veneer, matched for color.
- B. Fire Rated Doors:
 - 1. Provide UL rated frame. Match color of door face veneer.
 - 2. Equal to: "Air Louvers", "Slimline" lite kits with glazing.
 - 3. Factory glaze doors using compatible veneered metal lite kits.

C. Glass:

- 1. Refer to drawings for type and thickness.
- 2. See Section 08800 Glass and Glazing.

2.05 FITTING AND FINISHING

- A. Fitting:
 - 1. Doors may be fitted for hardware at job site or pre-fitted and pre-machined at factory.
- B. Factory Finish (Contractor's Option):
 - 1. Generally, all doors shall be prefinished at the factory, unless indicated as field stained or a custom stain match is required.
 - 2. Selected finish color must be able to be matched.
 - 3. Transparent Finish shall match finish requirements indicated in AWI-"TR6".
 - 4. Comply with referenced AWI "Factory Finishing" for Premium Grade factory finish systems.
 - 5. Finish wood doors using three coats of water-clear, 100% solids, modified acrylic urethane, cured immediately with ultra-violet light. Factory seal all doors on all 6 sides.
- C. Field Stained Finish (Contractor's Option):
 - 1. Field stained doors on site shall be per requirements of Section 09900 Painting.
 - 2. Where matching to existing doors is required, supplier shall field verify all requirements so as to match existing door type, wood species, face cut, graining, and stain color, including custom stain matching as required.
- D. Coordination:
 - 1. Finish or stain doors before hanging.
 - 2. Variations in finish due to body oils on doors, planer marks or other irregularities not attributable to natural wood grain variations will be cause for rejection.

2.06 <u>ADHESIVES</u>

- A. Adhesives:
 - 1. Face to core adhesives shall be Type I or Type II as appropriate for location in building.
 - 2. All adhesives must be classified Type I or Type II per WDMA TM-6 "Adhesive Bond Test Method."
 - 3. Use Type I adhesives for doors in exterior applications.
 - 4. Use Type II adhesives for doors in interior applications.

PART 3 - EXECUTION

- 3.01 INSPECTION
 - A. Examine door frames and verify that frames are correct type and have been installed as required for proper hanging of corresponding doors. Do not proceed with installation until unsatisfactory conditions have been corrected.

- B. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb, square, and level jambs and heads.
- C. Modify existing wood doors to receive new door hardware, where applicable. Drill, Cut, patch, and sand smooth, modified areas. Modifications shall be seamless and not noticeable. Use touch up stain provided by custom stain manufacturer. Clear coat with Polyurethane after custom stain has dried.

3.02 INSTALLATION

- A. Condition doors to average prevailing humidity in installation area prior to hanging. Install doors after building humidity is at an acceptable level.
- B. Handle doors in accordance with recommendations of WDMA I.S. 1-A, "Care and Installation at Job Site".
- C. Install wood doors in strict accordance with manufacturer's published instructions and as shown.
- D. Install accurately in frame. Install within the clearances specified in the manufacturer's written instructions. Install plumb, level, square and true.
- E. Install to operate freely, but not loosely, free from hinge and strike binding conditions. All doors shall be free from rattling when in the latched position.
- F. Pilot holes to be drilled for screws attaching hinges, locksets, and all other hardware to be installed on the doors. Pilot holes shall not exceed 90% of the diameter of the screw.
- G. Remove and replace all doors found to be warped, twisted, bowed, or otherwise damaged. Do not install doors which cannot be properly fitted to frames.
- H. Adjust pre-finished doors and hardware and other moving or operating parts to function smoothly and correctly.
- I. Ensure that smoke gaskets are in-place before pre-finished door installation.
- J. Bevel non-fire rated doors 1/8 inch in 2 inches lock and hinge edges.
- K. Fit to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.
- L. For non-rated doors provide the following clearances:
 - 1. 1/8 inch at jambs and heads.
 - 2. 1/2 inch at floor finish or covering.
- M. For installation of hardware, See Division 08710 Finish Hardware.

3.03 ADJUST AND CLEAN

- A. Rehang or replace doors which do not swing or operate freely.
- B. Refinish or replace doors damaged during installation.
- C. Protect installed wood doors from damage or deterioration until Substantial Completion.

- D. Adjust doors for a smooth, balanced, fully functional opening.
- E. Clean pre-finished doors and hardware.

SUBMITTAL CHECKLIST

- 1. Manufacturer's Literature.
- 2. Shop Drawings.
- 3. Samples.
- 4. Warranty.
- 5. Certification.

END OF SECTION 08211

SECTION 08305 - ACCESS DOORS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Metal access doors as shown on the Drawings and specified herein, including:

- 1. Access doors in walls.
- 2. Access doors in ceilings.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 09900 - Painting Division 15 - Mechanical Access Panels Division 16 - Electrical Access Panels

1.03 QUALITY ASSURANCE

- A. Fire Resistive Ratings:
 - 1. Where access doors are shown in rated assemblies, provide panel door, frame, hinge and latch from manufacturer listed by Underwriters Laboratories for ratings indicated.
- B. Use manufacturer's standard size units for nominal sizes indicated. Field coordinate actual unit sizes with rough openings and built-in anchors and inserts.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job in manufacturer's unopened packages with labels intact.
- B. Store and handle produces so as to prevent damage. Remove all damaged items from the job site.

1.05 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's published catalog information, product data sheets and cutsheets.
 - 2. UL fire rated test data stating achieved rating.

PART 2 - PRODUCTS

Α.

2.01 ACCEPTABLE MANUFACTURERS

- Provide products, as approved by the Architect, from one of the following acceptable manufacturers:
 - 1. Babcock-Davis.
 - 2. Bilco.
 - 3. Dayton.
 - 4. J.L. Industries.
 - 5. Karp Associates, Inc.
 - 6. Milcor Incorporated.
 - 7. Vestal Manufacturing Co.

2.02 <u>MATERIALS</u>

- A. Access Doors:
 - 1. Door: 14 gage steel.
 - 2. Frame: 16 gage steel with 1 inch flange.
 - 3. Hinge: Concealed spring type, 175 degree opening.
 - 4. Lock: Screwdriver activated cam lock.
 - 5. Finish: Gray baked enamel prime coat. Prepped for finish field coats.

- 6. Sizes: 20 inches x 40 inches minimum at attic access, unless otherwise indicated on Drawings. 24 inches x 24 inches all other locations, unless otherwise indicated on Drawings.
- B. Fire-Rated Access Doors:
 - 1. Door: 20 gage steel, insulated sandwich panel construction.
 - 2. Frame: 15 gage steel with 1 inch flange.
 - 3. Hinge: Concealed pin type.
 - 4. Lock: Recessed turn ring with interior latch release.
 - 5. Closer: Spring type closer, adjust to assure positive latching.
 - 6. Finish: Gray baked enamel prime coat. Prepped for finish field coats.
 - Sizes: 20 inches x 40 inches minimum at attic access, unless otherwise indicated on Drawings.
 24 inches x 24 inches all other locations, unless otherwise indicated on Drawings.
 - 8. Label: 1-1/2 hour "B" label, unless otherwise indicated on Drawings.

2.03 FABRICATION

A. Fabricate units of continuous welded construction.

- B. Neatly fit all joints, and grind welds smooth and flush with adjacent surfaces.
- C. Furnish each access door as a complete unit with all parts ready for installation.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Field verify all rough opening dimensions.
- B. Assure that sufficient inserts, blocking and built-in anchors are provided for secure installation of doors.

3.02 INSTALLATION

- A. Install per manufacturer's recommendations.
- B. Painting of doors is specified in Section 09900.

3.03 ADJUSTING AND CLEANING

- A. Adjust hardware so that all doors operate smoothly and freely.
- B. Remove and replace panels or frames which are bowed, warped or damages.

3.04 PROTECTION

A. Protect doors from damage until Substantial Completion.

SUBMITTAL CHECKLIST

1. Product Data.

END OF SECTION 08305

SECTION 08410 - ALUMINUM ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the aluminum thermal-type and non-thermal type Entrances and Storefronts as shown on the Drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 07900 - Joint Sealers Section 08710 - Finish Hardware Section 08800 - Glass and Glazing

1.03 QUALITY ASSURANCE

- A. Comply with all Federal, State and Local building codes and regulations.
- B. Thermal Performance:
 - 1. AAMA Test Procedure 1502.7.
 - 2. Condensation Resistance Factor (CRF) of 43 (min.) at equivalent of 15 MPH wind velocity.
- C. Air Infiltration:
 - 1. ASTM E283.
 - 2. Maximum infiltration .06 CFM/ft. crack length under static pressure of 6.24 PSF (equivalent of 50 MPH wind velocity).

D. Water Infiltration:

- 1. ASTM E331.
- 2. No water penetration for 15 minutes with 5 gal./hr./s.f. at 10.0 PSF pressure.
- E. Uniform Loading:
 - 1. ASTM E-330.
 - 2. Max. 1/175 deflection, no permanent deformation under a load of 25 PSF.

1.04 SUBMITTALS

- A. Shop Drawings:
 - 1. Submit complete shop drawings prior to fabrication.
 - 2. Indicate metal thickness, construction, installation and anchorage details.
- B. Samples:
 - 1. Section of window wall assembly with glass.
 - If finish is selected, submit sample of finish indicated. If not indicated, submit color and finish samples for selection by the Architect, from manufacturer's entire standard selection.
- C. Test Reports:
 - 1. Submit test reports certified by the mullion manufacturer's testing laboratory.
 - 2. Show compliance with performance requirements.
- D. Warranty:
 - 1. Submit warranty as specified herein.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store doors and frames at the job site in such a manner as to prevent damage.
- B. Remove all damaged or otherwise unsuitable doors and frames from the job site.
- 1.06 <u>WARRANTY</u>
 - A. Provide written manufacturer's guarantee against defective workmanship and materials for a period of two (2) years.
 - B. Provide written manufacturer's guarantee of Kynar 500 PVF finish for a period of 20 years. (Alternate No. 4).

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide thermal barrier type mullion window and door system, to be approved by the Architect, as manufactured by one of the following approved manufacturers:
 - 1. "EFCO"
 - 2. "Kawneer"
 - 3. "Tubelite"
 - 4. "Vistawall"
 - 5. "United States Aluminum"
 - 6. "Traco"
 - 7. "Wausau Window and Wall Systems"
 - 8. "Arch Aluminum and Glass"
 - 9. "YKK AP"
 - 10. "Manko Window Systems"
 - 11. "Graham Architectural Products"
- B. Clarification that any/all entrances and storefronts in the scope of work are to all be provided by a single source manufacturer for the entire project.

C. Basis of Specification:

- 1. Window Wall Systems:
 - a. "EFCO", Series 403 (T), Thermal Storefront Framing.
 - Provide at all locations exposed directly to the exterior.
 - "EFCO", Series 402 (NT), Non-Thermal Storefront Framing.
 Provide at all locations interior to the building, including interior unit of vestibules, unless otherwise indicated.
- 2. Door Systems:
 - a. Wide Stile: "EFCO", Series D500 Wide Stile Doors, 1-3/4" Standard Doors.
 - b. Custom modified to provide for widths and depths of stiles and rails as indicated on the Drawings, Door Elevations, and as specified herein.

2.02 <u>MATERIALS</u>

- A. Aluminum Extrusions:
 - 1. ASTM B 221.
 - 2. Alloy 6063-T5.
 - Finish: Class 1, Clear Anodic Coating, AA-M12C22A41 (Base Bid).
 OR
 - Finish: Kynar 500 polyvinylidene fluoride (PVF) two-part resinous coating with 20 year warranty. Color to be selected from manufacturer's entire standard selection (Alternate No. 4).

- B. Aluminum Sheets:
 - 1. ASTM B209.
 - 2. Alloy 5005 where exposed, 3003 where concealed.
 - 3. Finish: Match extrusions.
- C. Fasteners and Anchors:
 - 1. Stainless steel or aluminum, finish to match extrusions at exposed fasteners.
- D. Glass:
 - 1. 1 inch insulating glass for all exterior glass applications.
 - 2. 1/4 inch glass for all interior applications and all door units.
 - 3. See Section 08800 for glass specifications.
 - 4. See drawings for window, door and frame elevations.
- E. Thermal Break:
 - 1. Poured polyurethane or PVC, standard with manufacturer.
 - 2. 3/8 inch minimum thickness.
- F. Setting Blocks:
 - 1. As specified in Section 08800.
- G. Glazing Gaskets:
 - 1. Elastomeric gaskets of type recommended by window manufacturer.
- H. Glazing Tape:1. Shimmed polymer type recommended by window manufacturer.
- I. Perimeter Joint Sealer:
 - 1. As specified in Section 07900.
- J. Backup Joint Filler:
 - 1. Closed-cell expanded polyethylene, as specified in Section 07900.
- K. Joint Cleaner:
 - 1. Cleaner recommended by sealant manufacturer for the specified joint surface condition.
- L. Joint Primer and Sealer:
 - 1. Compounds recommended by sealant manufacturer for the specific joint surface conditions.
- M. Bond Breaker:
 - 1. Polyethylene tape.
- N. Weatherstripping:
 - 1. Neoprene, hypalon, vinyl, PVC, as standard with manufacturer, double row, continuous with vulcanized corners.
- O. Subsill:
 - 1. High Performance extruded aluminum with thermal break, and integral weep hole system.
- P. Provide all blocking, backings and supports in all horizontal and vertical members as required for reinforcing of all door hardware as specified herein or in Section 08710.

Q. Hardware:

- 1. See Section 08710 Finish Hardware for all other items not listed herein.
- 2. Weatherstripping (Provide on all exterior doors):
 - a. Vinyl, Neoprene, EPDM, TPE (thermoplastic elastomer), or silicone.
 - b. Full length and width of opening at each condition.
 - c. Provide weatherstripping seal sets at entire perimeter jambs and head of all exterior doors, whether scheduled or not.
 - d. All weatherstripping sets shall be determined by the door hardware supplier as appropriate to the application and able to provide a weather-tight and weather-proof seal, while allowing proper operation of the door and all other hardware.
 - e. Jambs and Head: Manufacturer's standard type per requirements of this specification herein.
 - f. Meeting Astragal: Manufacturer's standard type per requirements of this specification herein. Coordinate with removable mullion, if applicable.
 - g. Door Bottom Sweep:
 Vinyl, Neoprene, EPDM, TPE (thermoplastic elastomer), or silicone weathersweep, screw applied to door with concealed fasteners. Finish to match door.
- 3. Push/Pull Handles: equal to HEWI 550.33 GKR, color as selected. Mount back to back on all doors.
- 4. Cylinder Collar: equal to HEWI, color as selected.
- 5. Hinges: Manufacturer's standard.
- 6. Closer: Manufacturer's standard concealed overhead closer for high traffic areas, with reduced opening force to meet current A.D.A. Standards.

2.03 FABRICATION

- A. Window Wall Members:
 - 1. Main extruded members: Minimum thickness .075 inches minimum.
 - 2. Vertical and horizontal framing members: 2 inches nominal face dimension.
 - 3. Perimeter members: 2 inches nominal face dimension.
 - 4. Overall depth: 4-1/2 inches nominal.
- B. Door Members:
 - 1. Minimum Thickness: .075" minimum.
 - 2. Overall Depth: 1-3/4 inches nominal.
 - Vertical Stiles: Provide as indicated on Drawings or Door Elevations (modified wide stile). If not indicated, provide 5 inches nominal width (wide stile). Reinforce for continuous hinges specified herein or in Section 08710.
 - Top Rail: Provide as indicated on Drawings or Door Elevations (modified wide stile).
 - If not indicated, provide 5 inches nominal width (wide stile). Reinforce for closers or holders specified herein or in Section 08710.
 - Intermediate Panic Rail: Provide as indicated on Drawings or Door Elevations (modified wide stile).
 If not indicated, provide 6 inches nominal width.
 Location to be centered on panic device with dimension as required by Code and ADA.
 - Reinforce for panic devices specified herein or in Section 08710.
 - 6. Bottom Rail: 10 inches nominal width (modified). Accessory line as required for extra tall rail.
- C. Thermal Break:
 - 1. Provide thermal break on all window members.
 - 2. Poured in place, self-adhering elastomer.
 - 3. Do not violate or bridge the thermal break with hardware or fasteners.

- D. Preassemble all units to the greatest extent possible to minimize field jointing and assembly at the site. Disassemble units only to the extent necessary to comply with shipping limitations.
- E. Fabricate all units to produce uniform sight lines and to be level, plumb, and in same plane as adjacent panels.
- F. Accurately fabricate all joints for proper fit and weld all corners.
- G. Provide slotted holes or other acceptable means for erection adjustment.
- H. Protect exposed surfaces against damage from scratches and discoloration.
- I. Provide fully resilient settings for glass panels by use of neoprene gaskets on both sides of glass.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

A. Examine all surfaces of opening and verify dimensions. Installation of frames constitutes acceptance of the existing conditions.

3.02 INSTALLATION

- A. Install window walls, doors and hardware in accordance with manufacturer's instructions.
- B. Assemble and anchor the various components to allow for expansion and contraction, maintaining a watertight condition.
- C. In general, for field assembly, conform to welding and joining requirements specified for shop fabrication.
- D. Install items plumb, straight, square, level and in their proper elevation, plane and location, and in proper alignment with other work. Employ only skilled workmen and erection.
- E. Install doors plumb an in alignment with frames. Apply hardware in accordance with hardware manufacturer's instructions. Drill and tap for machine screws. Adjust door installation for free and easy movement with uniform clearances and contact at stops.
- F. Use shims as required.
- G. Caulk perimeter after all lime, mortar, plaster and other corrosive materials have been removed from aluminum surface with solvents not harmful to finish. Provide backer rods as required.
- H. Install glass in window walls in accordance with recommendations of the mullion system manufacturer and requirements specified in Section 08800.

SUBMITTAL CHECKLIST

- 1. Shop Drawings.
- 2. Samples.
- 3. Test Reports.
- 4. Warranty.

END OF SECTION 08410

SECTION 08710 - FINISH HARDWARE

PART 1 – GENERAL

1.01 WORK INCLUDED

Furnish labor, materials, equipment, special tools, supervision and services required to complete all Finish Hardware work as indicated, noted, detailed, and scheduled on the Drawings and specified herein.

1.02 OWNER VERIFICATION AND REVIEW MEETING

Contractor and hardware supplier are required to meet with the Owner to review and verify the hardware schedule and sets per door. Contractor and supplier shall be responsible for verifying door and hardware handings, lockset operations, and keying required. All information, except for keying, shall be included in the submittals prior to being forwarded to the Architect.

1.03 KEYING MEETING

Contractor and hardware supplier are required to meet with the Owner to review and verify all requirements for keys and keying per door. Incorporate and coordinate all locking hardware in the Project to provide for a complete and unified system of keying. A complete keying schedule shall be submitted to the Architect and Owner, for approval, within seven days after the meeting. Determine cylinders and cores required to match or be compatible with any existing building master keying systems in place as per the Owner's requirements.

1.04 RELATED WORK SPECIFIED ELSEWHERE

- Section 01400 Quality Control
- Section 03300 Cast-in-Place Concrete
- Section 04220 Concrete Unit Masonry
- Section 06100 Rough Carpentry
- Section 07900 Joint Sealers
- Section 08110 Steel Doors and Frames
- Section 08211 Flush Wood Doors
- Section 08410 Aluminum Entrances and Storefronts
- Section 08800 Glass and Glazing
- Section 09900 Painting
- Section 13850 Fire Detection and Alarm System
- Division 16: Electrical components, connections, and coordination
- Section 17920 Access Control System
- Electrical Drawing

1.05 QUALITY ASSURANCE

- A. Hardware Supplier:
 - 1. An established firm dealing in architectural commercial door hardware, with an office, sample room, warehousing facilities and an adequate inventory.
 - 2. Has demonstrated a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project.
 - 3. Supplier must have, as an employee, an experienced and certified Architectural Hardware Consultant (AHC), who is available to Owner, Architect, and Contractor, for consultation throughout the course of the Work.
 - 4. Provide a competent technician to service the hardware on the job as may be required.
 - 5. A regular franchised distributor for all materials required for this project.
 - 6. Shall replace damaged or defective materials prior to shipment to the site. Repairs not acceptable.
 - 7. Shall meet with the Owner to review and verify all requirements and keying required.
 - 8. Shall conduct a comprehensive training class for the Owner's maintenance personnel prior to date of acceptance on all special application mechanical hardware provided under this Section.

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- B. All work to comply with the latest requirements of ADA, ICC/ANSI A117.1, and the accessibility chapter of the Building Code.
- C. All work to comply with the latest requirements of NFPA 80, NFPA 101 and NFPA 252 in providing hardware for all fire rated openings.
- 1.06 <u>REFERENCES</u>
 - A. American National Standards Institute (ANSI):
 - 1. ANSI A117.1, Providing Accessibility and Usability for Physically Handicapped People.
 - 2. ANSI/BHMA A156.1, Butts and Hinges.
 - 3. ANSI/BHMA A156.3, Exit Devices.
 - 4. ANSI/BHMA A156.4, Door Controls-Closers.
 - 5. ANSI/BHMA A156.6, Architectural Door Trim.
 - 6. ANSI/BHMA A156.7, Template Hinge Dimensions.
 - 7. ANSI/BHMA A156.13, Locks & Latches, Mortise.
 - 8. ANSI/BHMA A156.16, Auxiliary Hardware.
 - 9. ANSI/BHMA A156.18, Materials and Finishes.
 - B. American Society for Testing and Materials (ASTM):
 - 1. ASTM-E2074-2001 Standard Test Method for Fire Tests of Door Assemblies, Including Positive Pressure Testing of Side-Hinged and Pivoted Swinging Door Assemblies.
 - C. Code of Federal Regulations (CFR) Americans with Disabilities Act (ADA):
 - 1. Latest version as adopted, approved and accepted by the State.
 - D. Door and Hardware Institute (DHI):
 - 1. Keying Systems and Nomenclature.
 - 2. Hardware for Labeled Fire Doors.
 - 3. Sequence and Format for the Hardware Schedule.
 - 4. Abbreviations and Symbols.
 - E. National Fire Protection Association (NFPA):
 - 1. NFPA 80 Standard for Fire Doors and Windows.
 - 2. NFPA 101 Life Safety Code.
 - 3. NFPA 105 Recommended Practice for the Installation of Smoke-Control Door Assemblies.
 - 4. NFPA 252 Standard Methods of Fire Tests of Door Assemblies.
 - F. Steel Door Institute (SDI):
 - 1. SDI 100 Recommended Specifications for Standard Steel Doors and Frames.
 - G. Underwriter's Laboratories, Inc. (UL) UL Standards for Safety:
 - 1. UL 10C-97 Positive Pressure Fire Tests of Door Assemblies.
 - 2. UL 228 Door Closer-Holders, With or Without Integral Smoke Detectors.
 - 3. UL 305 Panic Hardware.

1.07 <u>SUBMITTALS</u>

- A. Hardware Schedule:
 - 1. Submit a completely detailed schedule of finish hardware in "Vertical Format" per the Door and Hardware Institute's Sequence and Format. Include a complete typewritten schedule indicating every item required for each door or opening. Schedules to include, but are not limited to; the manufacturers, model numbers, materials, types, styles, sizes, handings, finishes, etc.

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- 2. Numbering of hardware sets is to match those as indicated in the Specifications and as noted on the Door Schedule on the Drawings. Cross reference plans and schedules.
- 3. Include all prep of doors and frames required for hardware, including mounting heights, locations and dimensions.
- 4. Clearly indicate door sets altered from that specified.
- B. Owner Verification and Review Meeting:
 - 1. Submit with submittals, confirmation that the meeting was conducted with the Owner.
 - 2. Include list of those present at the meeting.
 - 3. Itemize all items resulting from discussions of the meeting in a "meeting minutes" format.
 - 4. Review of set functions shall be done on a "per door" basis, and not merely by sets. Sets included herein is for the convenience of review by grouping like conditions and not intended to necessarily be representative of same function for all doors in the set. Verify with Owner.
- C. Manufacturer's Product Information:
 - 1. Furnish catalog cutsheets, drawings, and other descriptive data on all hardware items.
 - 2. After final approval of the hardware by the Architect, furnish copies of submittals to door and frame suppliers and any other subcontractors and suppliers necessary for coordination and installation of door hardware complete.
- D. Samples:
 - 1. If requested by the Architect, submit one (1) sample of each different item of hardware for approval, accompanied by an itemized list showing where the different items are to be used, the manufacturer's number, the finish, sizes applicable, and the number required.
 - 2. Submit a full sample ring of hardware finishes for all manufacturers included.
 - 3. After review, the samples will be returned to the supplier.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver hardware or templates, or both to factory or to building as required by those furnishing items to which hardware is to be applied.
- B. Plainly mark packages or hardware so locations of use may be ascertained without breaking the packages.
- C. Deliver work so all work will progress without delay or interruption.
- D. The Contractor is responsible for providing adequate locked storage space for the scheduled quantities of hardware when delivered to the job.

1.09 PROJECT CONDITIONS

- A. The hardware supplier is responsible to examine the door and frame drawings and elevations to determine the suitability of hardware specified.
- B. It will be this supplier's responsibility to furnish the correct hardware to fit the door and frame conditions as indicated for correct and proper operation.

1.10 WARRANTY

- A. Furnish manufacturer's limited warranty covering defects in materials and workmanship for periods indicated as follows:
 - 1. Door Closers: Minimum Ten (10) years.
 - 2. Locksets: Minimum Ten (10) years.
 - 3. Exit Devices: Minimum Five (5) years.
 - 4. Hinges: Lifetime.
 - 5. All Other Hardware: Minimum One (1) year.

PART 2 - PRODUCTS

2.01 KEYING AND KEYS

- A. Key system must be a patented keyway.
- B. Key, master key and grandmaster key to Owner's requirements. The key schedule will be developed by hardware supplier in cooperation with Owner's representative.
- C. Provide six (6) grandmaster keys, six (6) master keys per group, and two (2) keys per lock.
- D. Engrave all keys with the words UNLAWFUL TO DUPLICATE THIS KEY.

2.02 LOCKS, LATCHES AND CYLINDERS

- A. All cylinders must be factory keyed. Provide certification from lock manufacturer stating cylinders have been factory keyed.
- B. All cylinders to have removable cores.
- C. Provide construction cores on all doors as required.
- D. Hardware supplier must be an <u>authorized stocking distributor</u> of the lock they propose to furnish.
- E. Provide a cylinder for every lock requiring one, whether specifically specified or not.
- F. Unless specifically indicated otherwise, all cylinders supplied throughout the entire project are to be capable of being keyed from the same master keying system. Key cylinders in dogged panic devices, keyed removable mullions, coiling doors, overhead doors, etc. to match building master keying system.

2.03 <u>FINISHES</u>

A. All finishes, typical, are to be:

Satin Chrome US26D (652 Plated Steel, 626 Plated Brass) unless otherwise indicated. Materials unable to have this finish applied are to have a finish to closely match and compliment (aluminum, dulled chrome, clear satin anodized, satin stainless steel, mil, painted, etc.).

- B. All finishes at clear anodized doors to be (Base Bid): Satin Chrome US26D (652 Plated Steel, 626 Plated Brass) unless otherwise indicated. Materials unable to have this finish applied are to have a finish to closely match and compliment (aluminum, dulled chrome, clear satin anodized, satin stainless steel, mil, painted, etc.).
- C. All hardware for painted or other aluminum storefront doors to have finish to match doors and frames. Contact Architect during bidding for any clarifications or concerns in providing finishes to match. (Alternate No. 4).

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D. Contact Architect during bidding for any clarifications or concerns for finishes to be provided.

2.04 HARDWARE SETS

- A. Verification:
 - 1. The following schedule is intended to describe, in general, the types and quantities of hardware required for the various types of doors and for the other parts of the building which will require hardware. Do not consider this schedule as entirely inclusive.
 - 2. Hardware supplier is responsible for visiting the jobsite and reviewing the requirements for each installation. The supplier shall be responsible for providing all hardware as required to serve the door's intended purpose and intent, and include all costs for such in their bid.
 - 3. Hardware supplier is responsible for coordination of all hardware items used together in conjunction with one another, mounting as required to coordinate with all doors and frames as designed, and include all costs for such in their bid.
 - 4. Hardware supplier is responsible for conducting the Owner Verification and Review Meeting, incorporating all items into submittals, and include all costs for such in their bid.
 - 5. Hardware supplier is responsible for conducting the Owner Keying Meeting, determining cylinders and cores required to match any existing building master keying system, provide and install compatible items and key per Owner's requirements.
- B. General Requirements:
 - 1. Provide all fire and smoke seals and gaskets as required per Code for all rated door assemblies and for all smoke partition assemblies; full perimeter at head, jambs and bottom.
 - 2. Provide glass and materials as required to meet and maintain fire ratings for all assemblies.
 - 3. All items as listed in hardware sets are "per door", unless otherwise indicated.
 - 4. All hardware to be mounted per ADA and ICC/ANSI A117.1.

2.05 HARDWARE PRODUCTS

A. Acceptable Manufacturers:

Hardware Item Hinges:	<u>Manufacturer</u> Ives, Hager, McKinney, Stanley, Bommer
Locksets (Cylindrical):	(Grade 1) Schlage, Falcon, Best, Sargent, Hager, Dorma, Yale
Deadbolts:	Schlage, Falcon, Best, Sargent, Hager, Dorma, Yale
Cylinders:	Building Master Key System (Coordinate with Owner)
Panic Devices:	(Premium Tier, Extra Security) Von Duprin
Push/Pulls:	lves, Glynn-Johnson, Hager, Rockwood, Trimco
Surface Closers:	(Premium Tier) LCN, Sargent
Wall/Floor Stops:	lves, Glynn-Johnson, Hager, Rockwood, Trimco
Wall/Floor Holders:	lves, Glynn-Johnson, Hager, Rockwood, Trimco
Overhead Stops/Holders:	Glynn-Johnson, Hager, Rockwood, Trimco, Rixson

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Removable Mullions:	Von Duprin, Falcon, Detex, Sargent, Dorma, Stanley, Yale,	
	Precision (PHI)	

Thresholds:	Hager, NGP, Pemko, Reese, Zero
Seals/Gaskets/Sweeps/Bottoms:	Hager, NGP, Pemko, Reese, Zero
Overhead Drip Guards:	Hager, NGP, Pemko, Reese, Zero
Flushbolts/Dustproof Strikes:	Ives, Hager, Rockwood, Trimco
Plates:	Ives, Hager, Rockwood, Trimco
Silencers:	lves, Hager, Rockwood, Trimco
Door Viewers:	lves, Hager
Position Switches:	Schlage, Securitron
Electric Strikes:	Von Duprin

- B. Hinges:
 - 1. All interior standard hinges shall be one of the following:
 - a. Ives, 5BB1WT, steel hinge and pin.
 - b. Hager, BB1168, steel hinge and pin.
 - 2. All exterior standard hinges shall be one of the following:
 - a. Ives, 5BB1HW, brass hinge and stainless steel pin.
 - b. Hager, BB1199, brass hinge and stainless steel pin.
 - 3. Interior and exterior standard hinges shall be 5 knuckle, ball bearing, heavy weight, full mortise, wide throw template type hinges with flush barrel and non-removable pins.
 - 4. All exterior hinges shall be of non-corrosive metals, stainless steel, brass, or aluminum as specified, and appropriate for finishes required. Painted or galvanized steel is not permitted.
 - All interior standard hinges shall be capable of 180 degree throw. Use wide throw hinges where necessary to clear jamb trim. Provide same material and finish as standard hinges such that all hinges match for like use and applications.
 - 6. Except where label provisions require larger or heavier hinges or where specified otherwise:
 - a. Provide 1-1/2 pairs of hinges for each door up to 7'-6".
 - b. Provide 2 pairs of hinges for doors over 7'-6".
 - c. Use 4-1/2" hinges on doors up to 3'-4" wide.
 - d. Use 5" hinges on doors over 3'-4" wide.
 - 7. All continuous hinges shall be one or the followings:
 - a. Ives, 700, stainless steel
 - b. Hager Roton, 790-900, stainless steel.
 - 8. All continuous hinges at access control doors are to be provided with electric power transfer prep, located and sized as required to coordinate with devices, equipment and wiring needs.
- C. Locksets (Cylindrical):
 - 1. All heavy-duty Grade 1 cylindrical locksets shall be one of the following:
 - a. Schlage, ND Series, "Rhodes" lever and escutcheon.
 - b. Falcon, T Series, "Dane" lever and escutcheon.
 - c. Best, 9K Series, "15" lever and "D" escutcheon.
 - d. Sargent, 11 Line TZONE Series, "L" lever and escutcheon.
 - e. Sargent, 10 Line Series, "L" lever and escutcheon.
 - f. Hager, 3400 Series, "Withnell" lever and escutcheon.
 - g. Dorma, CL800 Series, "LR" lever and escutcheon.
 - h. Yale, 4700(LN) Series, "Augusta AU" lever and escutcheon.
 - i. Stanley, QCL 100 Series, "Sierra E" lever and escutcheon.

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- 2. All locksets shall have 2-3/4" backset with appropriate standard strike package.
- 3. All suites shall be equipped with latch having a dead latching pin. Function shall provide for antiintruder capabilities which enable the doors to be closed and locked from the inside of the room, allow egress from the inside without the use of a key, and remain locked upon re-closing without relocking by key. No deadbolt is permitted. Function equal to:
 - a. "Schlage" L9071, Security Lock.
 - b. "Sargent" 38, Security Lock.
- 4. All other conditions, function and operation as selected by Owner from all manufacturer's available.
- D. Deadbolts (Cylindrical, when no mortise set is present):
 - 1. All heavy-duty Grade 1 deadbolts shall be one of the following:
 - a. Schlage, B560 Series.
 - b. Falcon, D100 Series.
 - c. Best, T Series.
 - d. Sargent, 34 Series.
 - e. Sargent, 480 Series.
 - f. Hager, 3100 Series.
 - g. Dorma, D800 Series.
 - h. Yale, 3500 Series.
 - 2. Provide with standard backset and high security dead latching lockbolt.
 - 3. Deadbolts from public rooms shall be equipped with anti-throw capabilities such that the latch cannot be thrown from the interior side of the room. Operation of the inside ADA compliant thumbturn shall allow the locked deadbolt to unlatch without the use of a key.
 - 4. All other conditions, function and operation as selected by Owner from all manufacturer's available.
- E. Panic Devices (Rim Type): (Premium Tier, Extra Security)
 - 1. All panics shall be one of the following:
 - a. Von Duprin, 99 Series, "06" lever design.
 - Provide option for two-piece latch bolt at all exterior entry door locations. The tapered section of the latch bolt recedes and the remaining section forms a 90 degree angle to the strike pad, making the latch more secure to entry shall be one of the following:
 a. Von Duprin, XP 99 option.
 - 3. Provide Lever Trim with ANSI Function "08" on exterior of all devices, unless indicated otherwise. Only compression springs shall be used in devices, latches and outside trim and/or controls.
 - 4. Where Door Pulls are scheduled, provide lves 8190, 90 degree offset pull. 12" center-to-center x 1" diameter x 3-1/4" projection, concealed mounting, brass.
 - 5. All exterior doors to receive locking cylinders with night latch function, unless indicated otherwise.
 - 6. Provide Cylinder Dogging on all devices, unless specifically indicated otherwise.
 - 7. Provide cylinders for all panic devices to be compatible for brand of locksets provided and/or for building's master keying system.
 - 8. Exterior panic doors to have universal function, adjustable in the field for operation as desired.
 - 9. All other conditions, function and operation as selected by Owner from all manufacturer's available.
 - 10. Exit devices shall be tested to ANSI/BHMA A156.3 test requirements by a BHMA certified laboratory. A written certification showing successful completion of a minimum of 1,000,000 cycles shall be provided upon request.
 - 11. Touch pad shall extend a minimum of one half of the door width. Maximum unlatching force shall not exceed 15 pounds. End cap will have three-point attachment to the door.

- 12. Provide roller strikes for all rim and surface-mounted vertical rod devices, ASA strikes for mortise devices, and manufacturer's standard strikes for concealed vertical rod devices.
- 13. All devices to incorporate a security dead-latching feature.
- 14. Provide removable mullion for any pair of doors where panic devices are used, whether scheduled or not. Prep frames as required.
- F. Electrified Panic Devices: (Premium Tier)
 - 1. All electrified panics shall be one of the following (to match series of all others specified):
 - a. Von Duprin, 99 Series, "06" lever design.
 - b. Stanley (PHI), Apex 2100 Series, "A" lever design.
 - 2. Provide equal to Von Duprin EL Electric Latch Retraction option to allow for a control station actuator (key switch, credential reader, etc.) to remotely unlatch and retract the latch bolt.
 - 3. Provide SD-EL Special Center Case Dogging for cylinder dogging capability.
 - 4. Provide cylinders for all panic devices to be compatible for brand of locksets provided and/or for building's master keying system.
 - 5. Provide equal to Von Duprin EPT-2 Power Transfer.
 - 6. Provide equal to Von Duprin PS914 Power Supply.
 - Provide equal to Von Duprin 900-2RS option for 2 relay EL panic device control board. Provide equal to Von Duprin 900-BB option for battery backup. Provide equal to Von Duprin 900-FA option for input of a normally closed fire alarm contact to the fire alarm system.
 - 7. Provide equal to Von Duprin E996L electrified Lever Trim with cylinder operation for night latch function on all devices, unless indicated otherwise.
 - Where Door Pulls are scheduled, provide lves 8190, 90 degree offset pull.
 12" center-to-center x 1" diameter x 3-1/4" projection, concealed mounting, brass.
 - Field convertible between Fail-Safe and Fail-Secure. Upon loss of power, the panic device and trim shall fail to Fail Secure condition so that the door remains in a locked position to maintain security to the building and spaces.
- G. Push/Pulls:
 - 1. All push plates shall be Hager, A40R, size: 6"x16", brass.
 - 2. All pulls shall be Hager, 9G, brass.
 - 3. All flush cup pulls shall be Hager, 17N, brass.
- H. Surface Closers: (Premium Tier)
 - 1. Push side condition (with parallel arm) shall be one of the following:
 - a. LCN, 4110 Series (4111 cylinder).
 - b. Sargent, 281 Series.
 - 2. Pull side condition (with non-parallel arm) shall be one of the following:
 - a. LCN, 4040 Series (4041 cylinder).
 - b. Sargent, 281 Series.
 - 3. Provide reduced force ADA cylinder.
 - 4. Door closers shall be hydraulic, full rack and pinion action with a high strength cast iron cylinder. Cylinder body shall be 1-1/2" diameter, and double heat-treated pinion shall be 11/16" diameter. A written certification showing successful completion of a minimum of 1,000,000 cycles shall be provided upon request.
 - 5. All closers shall have forged steel main arms and forearms.
 - 6. Mounting shall be on the inside face of the door, interior to the room. Closers shall not be seen on the corridor, hallway or public side of the door.
 - 7. All covers shall be metal.
 - 8. All finishes shall be powder coat aluminum.
 - 9. Provide hold open functions where specified. All hold opens to be adjustable set up to 180 degrees.

- 10. Provide concealed closer in lieu of surface closer where a closer is used in conjunction with overhead stops/holders.
- 11. In all cases, the manufacturer's recommended table of sizes is to govern the size of closers to be furnished.
- 12. Use through-bolts to fasten surface closers to mineral core wood and hollow metal doors.
- 13. Furnish special overhead closers where shown or specified.
- 14. Provide arms, corner brackets, mounting brackets, or drop plates as required.
- 15. Provide 180° door swing wherever possible.
- 16. Reduced force opening of less than 5 lbs. of force for interior hinged doors per ADA.
- 17. Closing speed of sweep period shall be adjusted so that from an open position of 70 degrees the door will take at least 3 seconds to move to a point 3 inches from the latch per ADA.
- I. Wall/Floor Stops:
 - 1. All wall stops shall be one of the following:
 - a. lves, WS401CCV, brass.
 - b. Hager, 236W, brass.
 - 2. All floor stops shall be one of the following:
 - a. Ives, FS436; FS438 if high stop condition is required, brass.
 - b. Hager, 241F; 243F if high stop condition is required, brass.
 - 3. All heavy-duty floor stops shall be one of the following:
 - a. Ives, FS18S, steel stud grouted in concrete.
 - b. Hager, 269F, steel stud grouted in concrete.
 - 4. Provide stops or bumpers wherever an opened door strikes any part of building construction, whether indicated or not. In general, provide wall mounted stops for all doors.
 - 5. Furnish floor dome type where wall type cannot be used.
 - 6. Furnish heavy-duty floor stops at all exterior entry and panic doors, whether indicated or not.
- J. Wall/Floor Holders:
 - 1. All wall holders shall be one of the following:
 - a. Ives, WS40.
 - b. Hager, 327W.
 - 2. All floor holders shall be one of the following:
 - a. Ives, FS40.
 - b. Hager, 326F.
- K. Overhead Stops/Holders:
 - 1. All overhead stops shall be Glynn-Johnson, 90 Series.
 - 2. Set units for combination of stop and hold open functions.
 - 3. Coordinate installation with closers for proper operation and performance.
 - 4. Provide concealed closer in lieu of surface closer where a closer is used in conjunction with overhead stops/holders.
- L. Removable Mullions:
 - 1. All removable mullions shall be one of the following:
 - a. Von Duprin, 4954.
 - b. Falcon, 4023.
 - c. Detex, 90KR.
 - d. Sargent, L980.
 - e. Hager, 4900.
 - 2. Rim cylinders compatible with those for locksets.
 - 3. Strikes compatible with panic devices and locksets.
 - 4. Finish painted to match frame.

- 5. Provide removable mullion for any pair of doors where panic devices are used, whether scheduled or not, and whether frame is existing or new.
- 6. Provide fire rated devices in all fire rated openings.
- M. Thresholds:
 - 1. Aluminum, saddle-type.
 - 2. Fully ADA compliant.
 - 3. Span entire width and depth of opening.
 - 4. 1/2" maximum height.
 - 5. 1:2 ratio bevel slope.
 - 6. Finish to match all other hardware specified for opening, and storefront units where applicable.
- N. Seals/Gaskets/Sweeps/Bottoms (used for Weatherstripping):
 - 1. All bottoms for doors with recessed bottom channels shall be one of the following: a. Hager, 750SN.
 - 2. All bottoms for doors without recessed bottom channels shall be one of the following: a. Hager, 772S.
 - 3. All bottoms to be mil finish aluminum.
 - 4. Provide bottoms on all exterior doors, whether scheduled or not.
 - 5. Weatherstripping to be Vinyl, Neoprene, EPDM, TPE (thermoplastic elastomer), or Silicone.
 - 6. Full length and width of opening at each condition.
 - 7. All weatherstripping sets shall be determined by the door hardware supplier as appropriate to the application and able to provide a weather-tight and weather-proof seal, while allowing proper operation of the door and all other hardware.
 - 8. Provide weatherstripping seal sets at entire perimeter jambs and head of all exterior doors, whether scheduled or not.
- O. Seals/Gaskets (used for Sound Seals):
 - 1. All sound seals shall be one of the following:
 - a. Pemko, S88 Series.
 - 2. Silicone, adhesive-backed, with compression bulb and stabilizer flange.
 - 3. Full length and width of opening at each condition.
 - 4. Provide sound seal sets at entire perimeter jambs and head.
- P. Seals/Gaskets (used for Fire and Smoke Seals):
 - 1. All fire and smoke seals shall be one of the following: a. Pemko. HSS2000 Series.
 - 2. High temperature silicone, self-extinguishing and non-toxic.
 - 3. Full length and width of opening at each condition.
 - 4. Provide fire and smoke seal sets at entire perimeter jambs and head as required.
- Q. Overhead Drip Guards:
 - All drip strips shall be NGP, 16 Series.
 2-1/2" wide x 1-1/2" high x full width of the door frame. Arching horizontal drip shield and vertical fastening leg.
 - 2. All drip strips to be aluminum.
 - 3. Provide clear anodized finish as applicable to match aluminum door. If not an aluminum door, match all other hardware. Provide clear anodized, typical.
 - 4. Install drip strip along top edge of all exterior doors, whether scheduled or not. Caulk sealant along top edge.

- R. Flushbolts/Dustproof Strikes:
 - 1. All flushbolts shall be one of the following:
 - a. lves, 262.
 - b. Hager, 281D.
 - 2. Provide at top and bottom of doors.
 - 3. Provide dust proof strike for bottom flushbolts, provide as deep as possible.
- S. Plates:
 - 1. All kick plates shall be
 - height=8", length=2" less than door, unless otherwise indicated, and one of the following: a. Ives, 8400.
 - b. Hager, 194S.
 - 2. All armor plates shall be
 - height=36", length=1" less than door, unless otherwise indicated, and one of the following: a. Ives. 8400.
 - b. Hager, 194S.
 - 3. All plates to be .050" thick minimum, brass, stainless steel, or aluminum.
 - 4. All plates to have beveled edges on all 4 sides.
 - 5. All plates to have countersunk screws.
 - 6. Screw-fasten solid to door.
 - 7. Provide kick plates on the interior side of all doors in a restroom, custodial or janitorial room, mechanical or electrical room, laundry room or other such utility space, whether scheduled or not.
 - 8. Provide armor plates on both sides of all crash or impact doors, whether scheduled or not.
- T. Silencers:
 - 1. All door silencers in metal frames shall be one of the following:
 - a. Ives, SR64.
 - b. Hager, 307D.
 - 2. Furnish silencers for all interior single and pairs of doors, whether scheduled or not.
 - 3. Omit silencers at doors where they may interfere with other types of seals already required, such as fire rated doors, smoke doors, sound proof doors, or light proof doors.

U. Door Viewers:

- 1. All door viewers shall be one of the following:
 - a. lves, 698.
 - b. Hager, 1756.
- 2. 180 minimum degree angle of view.
- 3. Solid brass body and barrel with one-way glass lens.
- 4. Finish to match all other hardware specified for opening, and storefront units where applicable.
- 5. Locate in door as directed by the Architect.
- V. Position Switches:
 - 1. All position switches for hollow metal doors in hollow metal frames shall be one of the following:
 - a. Schlage, 679-05 HM.
 - b. Securitron, DPS-M.
 - All position switches for aluminum doors in aluminum frames shall be one of the following:
 a. Schlage, 7764.
 - 3. Monitor the position status of door.
 - 4. Concealed switches, flush-mounted in top of door and head of frame, directly opposite one another.
 - 5. Magnetic switch and a permanent magnet, normally closed.
 - 6. Finish as selected by Architect.

W. Electric Strikes:

- 1. All electric strikes for cylindrical locksets shall be one of the following: a. Von Duprin, 6200 Series.
- 2. All electric strikes for panic devices and removable mullions shall be one of the following:
 - a. Von Duprin, 6100 Series.
- 3. Provide Von Duprin PS902 Power Supply.
- 4. 24 VDC or 12 VDC voltage as selected.
- Field convertible between Fail-Safe and Fail-Secure. Upon loss of power, the electric strike shall fail to Fail Secure condition so that the door remains in a locked position to maintain security to the building and spaces.
- 6. Adjustable keeper.
- 7. Internal solenoid.
- 8. Non-handed.
- 9. Continuous duty operation.
- 10. Tamper resistant faceplate.
- 11. Stainless steel material. Finish on stainless steel to match all other hardware at opening.
- 12. Hardware supplier is responsible to coordinate the model required with the condition of installation so as to assure proper fit. Verify condition and dimensions of door frames, mullions, removable mullions, and abutting walls where strikes are to be installed.
- X. Electromagnetic Door Holders:
 - 1. Specified in Section 13850 Fire Detection and Alarm System.
- Y. Access Control Door Controllers:
 - 1. Specified in Section 17920 Access Control System.
- Z. Access Control Credential Readers:
 - 1. Specified in Section 17920 Access Control System.
- AA. Access Control Remote Entry and Camera System:
 - 1. Specified in Section 17920 Access Control System.
- BB. Egress Signage:
 - 1. A readily visible durable sign shall be posted on the egress side on or adjacent to the door stating: "THIS DOOR TO REMAIN UNLOCKED WHEN BUIDLING IS OCCUPIED". The sign shall be in letters 1 inch (25mm) high on a contrasting background. (Provide one (1) per egress door).

2.06 HARDWARE SCHEDULE

Hardware Set No. 1: Door 101A, 130A, 201, 206A, 210A, 216A, 220B, 224B, 228

Aluminum Door Manufacturers Standard Hinges Closer w/ Hold Open 180° degree swing where possible Push/Pull Handles Deadbolt with interior thumb turn Threshold (101A and 130A only) Floor Stop Egress Signage (101A and 130A only) Weatherstripping (101A and 130A only) (including top and bottom)

Hardware Set No. 2: Door 101B, 105B, 113B, 115B, 122B, 125B, 130B

Continuous Hinges Closer w/Hold Open 180° degree swing where possible Panic Device Armor Plate Threshold Floor Stop Weatherstripping Door Viewer

Hardware Set No. 3: Door 103, 107, 111, 118, 119, 127, 128, 204, 205A, 206B, 208, 210B, 213, 216B, 219, 220A, 222, 224A, 226, 231

Hinges Closer/180° degree swing where possible Lockset (cylindrical) Kickplate Wall Stop Silencers

Hardware Set No. 4: Door 104, 108, 110, 116, 121, 124, 131, 132, 133, 134A, 134B, 136, 137, 202, 209, 212, 218, 223, 227, 229

Hinges Lockset (cylindrical) Kick Plate Wall Stop Silencers

Hardware Set No. 5: Door pairs 105A, 113A, 113C, 115A, 122A, 125A

Aluminum door manufacturers standard Hinges (both leafs) Closer w/180° degree swing where possible (both leafs) Pull handles Keyed removable mullion Panic Device (both leafs) Threshold (both leafs) Floor Stop (both leafs) Weatherstripping (both leafs) (including top and bottom)

Hardware Set No. 6: Door 109, 138

Continuous Hinges Closer w/180° degree swing where possible Lockset (cylindrical) Armor Plate Threshold Floor Stop Weatherstripping

Hardware Set No. 7: Door 114A

Aluminum door manufacturers standard Continuous Hinges (both leafs) Closer w/ 180° degree swing where possible Electrified Panic Device (both leafs) (night latch function) (cylinder) Door Pulls (both leafs) Keyed removable mullion Threshold (entire opening) Floor Stop (both leafs) Weatherstripping (both leafs) Bottoms (both leafs) Position switches (both leafs) Access control door controllers Power Supply Power Transfer Access Control Panel Access Control Credential Reader See Section 17920 - Access Control Systems for additional requirements **See door access riser diagrams

Hardware Set No. 8: Door 114B

Rated hardware (90 minute) Hinges Armor Plate Closer w/180° degree swing (closer may not protrude into machine room space at any time) Lockset (group 2 locking device) (Provide a blank for the hoistway side of door). (Cylindrical) Smoke gaskets/seals Wall stop Threshold Seal

Hardware Set No. 9: Door 123A, 123B

Continuous Hinges Closer w/180° degree swing where possible **Kick Plate** Electrified Panic Device (night latch function) (cylinder) Door pull Threshold Floor Stop Weatherstripping Bottom **Position Switches** Access control door controllers Power Supply Power Transfer Access Control Panel Access Control Credential Reader See Section 17920 – Access Control System for additional requirements Door Viewer **See door access riser diagrams

Hardware Set No. 10: Door 205B, 232

Continuous Hinges Kick Plate Closer Panic Device Door Pull Wall Stop

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install finishing hardware as recommended by the National Builders Hardware Association.
- B. Only use fasteners supplied by the manufacturer. Provide fasteners of suitable size, quantity, type and finish to secure hardware in position for heavy use and long life.
- C. Hardware for application on metal surfaces:
 - 1. Made to standard templates.
 - 2. Fastening harmonized with hardware as to material and finish.
 - 3. Fastenings with approved type anchors according to the manufacturer.
 - 4. In general, ends of through-bolts shall be countersunk.
- D. Mount hardware in accordance with current state and federal accessibility standards and guidelines.
- E. Install hardware per manufacturers instructions and in compliance with:
 - 1. NFPA-80.
 - 2. NFPA-101.
 - 3. NFPA-105.
 - 4. NFPA-252.
 - 5. ANSI A117.1.
- F. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.
- G. Set units level, plumb, and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- H. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- I. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant complying with requirements specified in Division 7 Section "Joint Sealers".
- J. Weatherstripping and Seals: Comply with manufacturer's instructions and recommendations to the extent installation requirements are not otherwise indicated.

3.02 FIELD QUALITY CONTROL

A. Material supplier to inspect hardware after installation and before final acceptance in order to ensure that hardware has been properly installed. If there are any discrepancies the material supplier is to provide the Architect, General Contractor and Installer with a written report detailing any and all discrepancies. All discrepancies are to be corrected prior to final acceptance unless otherwise directed by the Owner.

3.03 ADJUSTING AND CLEANING

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit.
- B. Immediately prior to Substantial Completion replace all construction cores.
- C. Tag all keys.
- D. Check each key and each lockset to verify proper working order.
- E. Lubricate and adjust all hardware to provide smooth operation.
- F. Clean all hardware per manufacturer's instructions after installer makes final adjustments and prior to final acceptance, remove all mortar, drywall mud, paint overspray, foreign materials, labels, markings, soil, oils, etc. Polish all locksets, plates, and other hardware.
- G. Clean adjacent surfaces soiled by hardware installation
- H. Replace, at no cost to Owner, items that cannot be cleaned to manufacturer's level of new finish quality or that cannot be adjusted to operate freely and smoothly or as intended for the application made.
- I. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to function properly with final operation of heating and ventilating equipment.

SUBMITTAL CHECKLIST

- 1. Hardware Schedule.
- 2. Owner Verification and Review Meeting.
- 3. Manufacturer's Product Information.
- 4. Samples.

END OF SECTION 08710

SECTION 08740 - AUTOMATIC DOOR OPERATOR

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Furnish labor, materials, equipment, special tools, supervision and services required to install automatic entrance equipment as indicated on drawings and as specified herein.
- 1.02 <u>RELATED WORK ELSEWHERE:</u> Section 08110 - Steel Doors and Frames Section 08211 - Flush Wood Doors Section 08410 - Aluminum Entrance and Store Fronts Division 16 - Electrical

1.03 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies.
 - 1. Underwriters Laboratory, Inc. (UL).
 - 2. Federal Regulation ANSI 117.
 - 3. All automatic equipment to comply with ANSI A156. 10.

1.04 <u>SUBMITTALS</u>

A. Shop drawings showing compete elevations, details and method of anchorage to location; installation of hardware; size, shape and thickness of materials; joints and connections; and details of joining with other construction.

1.05 WARRANTY

A. Warranty of power operators, controls and labor provided by automatic door equipment installer against defects in material and workmanship at no cost to owner, for a period of one year from date of substantial completion.

PART 2 - PRODUCTS

2.01 AUTOMATIC SWING DOOR SYSTEM

- A. Automatic door operator shall be "System 500" as manufactured by Gyro-Tech, Inc. or equivalent.
- B. Mode of Operation:
 - 1. Spring Close. Operator shall open door by energizing motor and shall stop door by stalling motor against mechanical stop. Door shall close slowly by means of spring energy, closing force shall be controlled by gear system and motor being used as dynamic brake without power. Complete automatic door cycle 18 to 20 seconds.
 - 2. Manual door operation shall require less than 12 lbs. of force applied to door stile. System shall also operate as a manual door in event of power failure.
 - 3. Hold open time shall be adjustable. Door operation shall not require any fluids or gases under pressure to be used in opening and closing of door.
 - 4. Operator shall activate one leaf only at pairs of doors.
- C. Operator Housing:
 - 1. Aluminum extrusions with finished end caps and shall be prepared for mounting to new door frames. All structural sections shall have a minimum thickness of 0.146" (3.7 mm) and shall be fabricated of 6063-T5 aluminum alloy.
 - 2. Finish shall match door.
 - 3. Housing shall extend across full opening width at pairs of doors.

D. Power Operator:

Completely assembled and sealed unit which shall include helical gear-driven transmission, overriding clutch (to provide easy manual operation, spring-close), mechanical spring and bearings, all located in cast aluminum housing and filled with special lubricant for extreme temperature conditions. Attached to a transmission system shall be a DC shuntwound permanent magnet motor with sealed ball bearings. Motor shall operate from 115-volt supply and require less than 5 amps at full power stall. Complete unit shall be resilient mounted with provisions for easy replacement, without removing door from pivot or frame.

- E. Electrical Control:
 - 1. Self-contained unit including necessary transformer, relays, rectifiers, and other electronic components for proper operation and switching power operator.
 - 2. Relays shall be plug-in type for individual replacement. All connecting harnesses shall have interlocking plugs.
 - 3. Controls shall also include time delay for normal cycle. Control shall also include adjustable (0-60 second) time delay module.
- F. Connecting Hardware:

Connect conversion unit (CU) drive arm to inswing door with a urethane covered roller, which shall ride in a track fabricated of 6061-T6 aluminum alloy attached to the top door rail where required for pull-type operation. Outswing doors shall be connected to operator by a two-piece drive arm with self-aligning rod ends and connecting door bracket for push-type operation.

2.03 ACTIVATING DEVICES

A. Wall Switches:

6" diameter stainless steel, flush mounted, engraved with handicap symbol and "push to open".

PART 3 - EXECUTION

3.01 INSTALLATION

A. Automatic door equipment shall be installed in compliance with manufacturer=s recommendations and approved shop drawings.

3.02 CLEANING AND PROTECTION

A. After installation, clean framing members as recommended by manufacturer. Aluminum surfaces in contact with masonry, concrete and steel shall be protected from contact by use of neoprene gaskets where indicated, or a coat of bituminous paint to prevent galvanic or corrosive action. Protect unit from damage during subsequent construction activities.

END OF SECTION 08740

SECTION 08800 - GLASS AND GLAZING

PART 1 - GENERAL

1.01

WORK INCLUDED A. Glass and glazing as shown on the Drawings and specified herein.

1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 06200 - Finish Carpentry Section 08110 - Steel Doors and Frames Section 08211 - Flush Wood Doors Section 08410 - Aluminum Entrances and Storefronts

1.03 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. Glazing Material:
 - a. ANSI Z97.1.
 - b. ASTM 1036, Standard Specifications for Flat Glass.
 - 2. Safety Glazing:
 - a. Federal Standard CPSC 16 CFR 1201.
 - b. ANSI Z97.1.
 - c. ANSI Z97.1q.
 - d. U.S. Consumer Product Safely Commission Standard 16 CFR 1201 CI and CII.
 - e. ASTM C1172, Standard Specification for Laminated Architectural Flat Glass.
 - 3. Insulating Glass:
 - a. Manufacturing: ASTM E 6 P03, Class CBA.
 - b. Installation: SIGMA A-3000.
- B. Unless otherwise shown or governed by other reference standards specified, conform with details and procedures of FGMA Glazing Manual.
- C. The level of acceptability for glass and glazing products may be more strict than the basic standards referenced herein. The Owner and/or Architect reserve the right to determine whether a product is acceptable for its intended use, in its intended application, for its intended clarity of visibility, and as required for its intended aesthetic effect.

1.04 <u>SUBMITTALS</u>

- A. Manufacturer's Literature:
 - 1. Materials description and installation instructions for glazing compounds.
- B. Samples:
 - 1. Submit 6" x 6" actual sample of each glass type, color, tint, etc.
 - 2. Submit 12" x 12" actual sample of insulated units or spandrel units.
- C. Warranty:
 - 1. Submit specified warranty for review.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver glazing materials to project site in manufacturer's unopened containers, fully identified with trade name, color, size, hardness, type, class and grade. Store each item in accordance with manufacturer's instructions. Remove all damaged, or otherwise unsuitable material immediately from the job site.

1.06 JOB CONDITIONS

A. Do not perform work under adverse weather or job conditions. Install liquid sealants when temperatures are within lower or middle third of temperature range recommended by manufacturer.

1.07 <u>WARRANTY</u>

A. Provide manufacturer's warranty for insulated glass units against material obstruction of vision resulting from moisture infiltration or dust collection between interior glass surfaces for ten (10) years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following, or as otherwise specifically listed:
 - 1. "AGC Glass Company North America".
 - 2. "Guardian Industries".
 - 3. "Oldcastle Building Envelope".
 - 4. "Pilkington North America, Inc.".
 - 5. "Vitro/PPG Industries, Inc.".

2.02 <u>GLASS TYPES</u>

- A. Clear Float Glass:
 - 1. Glass sheet made by floating molten glass on a bed of molten tin.
 - 2. Thickness as shown on Drawings or specified herein.
 - 3. Safety glass in all doors, windows, transoms and sidelights, where required by code and where shown on the Drawings and specified herein, whether required by Code or not.
 - 4. Safety glass to be laminated or tempered at all exterior units and tempered at all interior units, unless otherwise indicated.
 - 5. Glass to be clear.
- B. Tinted Float Glass:
 - 1. Thickness as shown on Drawings or specified herein.
 - 2. All requirements of clear float glass apply as specified above, except glass lites to be tinted.
 - 3. Body tinted by adding colorants to normal batch of clear molten glass.
 - 4. Tint color to be as indicated or as selected by Architect from manufacturer's entire selection.
- C. Low-E Glass:
 - 1. Coated to reduce transmission of radiation, infrared, and ultraviolet rays.
 - 2. Smooth, sputter coating. Pyrolytic coatings are not permitted.
 - 3. Thickness as shown on Drawings or specified herein.
 - 4. All requirements of clear float glass or tinted float glass apply as specified above, except glass lites to be Low-E coated and applied to surface 2 (from outside face).
 - 5. See Tinted Float Glass for tint color, where tinted glass is required.
 - 6. Provide one of the following approved products, or an approved equal:
 - a. "AGC"; Energy Select 36.
 - b. "Guardian", SunGuard SuperNeutral 68.
 - c. "PPG", Solarban 60.

- D. Tempered Safety Glass:
 - 1. Thickness as shown on Drawings or specified herein.
 - 2. Single thickness of clear or tinted float glass.
 - 3. Reheated to just below melting point and suddenly cooled for tempering.
 - 4. Upon major impact, the glass surface shall shatter into small pieces free of sharp points or slivers.
 - 5. See Tinted Float Glass for tint color, where tinted glass is required.
- E. 1" Insulating Glass:
 - 1. Manufacturer's standard units comprised of (1) 1/4" outdoor lite and (1) 1/4" indoor lite with an overall nominal thickness of 1".
 - 2. Complete units tested and approved in accordance with requirements of the Sealed Insulating Glass Manufacturer's Association (SIGMA).
 - 3. Outdoor Lite:
 - a. 1/4" Low-E glass, tinted float glass.
 - b. Tempered safety glass.
 - c. All requirements of Low-E glass apply as specified above.
 - d. See Tinted Float Glass for tint color.
 - 4. Indoor Lite:
 - a. 1/4" clear float glass.
 - b. Tempered safety glass.
 - c. All requirements of tempered safety glass apply as specified above.
 - 5. Separate outdoor and indoor lites by 1/2" desiccant spacer bar.
- F. Impact-Resistant 1.060" Insulating Glass:
 - 1. Manufacturer's standard units comprised of (1) 0.31" outdoor lite and (1) .25" indoor lite with an overall nominal thickness of 1.060".
 - 2. Complete units tested and approved in accordance with requirements of the Sealed Insulating Glass Manufacturer's Association (SIGMA).
 - 3. Outdoor Lite (able to withstand small missile):
 - a. 0.31" Low-E glass, clear.
 - b. 2 x 1/8" laminated safety glass with .060 PVB. (Oldcastle Building Envelope Product #411000, thickness 0.31")
 - c. All requirements of Low-E glass apply as specified above.
 - 4. Indoor Lite:
 - a. 0.25" clear float glass.
 - b. Tempered safety glass.
 - c. All requirements of tempered safety glass apply as specified above.
 - 5. Separate outdoor and indoor lites by 1/2" desiccant spacer bar.

2.03 MISCELLANEOUS MATERIALS

- A. Glazing Sealant for Exterior Glazing:
 - 1. One Part Silicone, FS TT-S-00230C, Type II, Class A.
 - 2. Provide one of the following approved products:
 - a. "General Electric Company", 1200 Series.
 - b. "Dow Corning Corporation", Dow Corning Silicone Rubber Sealant.
 - c. "Tremco", Proglaze Silicone Construction Sealant.
 - d. "Pecora Chemical Corporation", 863.
 - e. "DAP, Inc.", Dap Flexiglaze 1231 Glazing Compound.

B. Glazing Tape:

- 1. Polyisobutylene / butyl.
- 2. Provide one of the following approved products:
 - a. "Tremco", Tremco 440 Tape.
 - b. "Pecora Chemical Corporation", G-66.
 - c. "Pecora Chemical Corporation", BB-50.
 - d. "DAP, Inc.", Butyl Rubber Tape.
- C. Setting Blocks:
 - 1. Neoprene blocks, 80 to 90 Type A durometer hardness.
- D. Spacers:
 - 1. Neoprene blocks, 40 to 50 Type A durometer hardness, 3" long, self-adhesive on one face only.

2.04 FABRICATION

- A. Sealed Edge Construction for Insulated Units:
 - 1. Fabricate units with a permanent, hermetically sealed, dry air or gas filled space of the width indicated, between sheets of glass as indicated.
 - 2. Except as otherwise indicated, fabricate units with 1/2" wide air spaces.
 - 3. Label each unit to show compliances with required standards and regulations.
 - 4. Indicate which face of unit is for exposure to exterior of weather.
 - 5. Provide removable label except where regulations require a permanent label.

PART 3 – EXECUTION

3.01 PREPARATION

A. Examine all surfaces to receive the parts of the Work specified herein.

- B. Verify all dimensions of in-place and subsequent construction.
- C. Application or installation of materials constitutes acceptance of the related construction.

3.02 INSTALLATION

- A. Employ only experienced glaziers who have had previous experience with the materials and systems being applied. Use tools and equipment recommended by the glass manufacturer.
- B. Maintain a minimum temperature of 40°F during glazing unless the manufacturer of the glazing materials specifically agrees to application of his materials at lower temperatures.
- C. Clean glazing stops and rabbets to receive glazing materials of all obstructions and deleterious substances which might impair the work. Remove protective coatings which might fail in adhesion of interfere with bond of sealants. Comply with manufacturer's instructions for final wiping of surfaces immediately before application of primer and glazing compounds or tapes.
- D. Inspect each piece of glass immediately before installation. Do not install pieces which are defective or damaged in any way.
- E. Set glass on setting blocks or shims. Use blocks of proper size and spacing to support the glass in accordance with manufacturer's recommendations.
- F. Provide spacers for all glass to separate glass from stops, except where continuous gaskets or tape are required.

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- G. Set glass in a manner which produces greatest possible degree of uniformity in appearance.
- H. Install glass according to manufacturer's recommendations and in accordance with the Flat Glass Marketing Association Glazing Manual.
- I. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.

3.03 CURING, PROTECTION AND CLEANING

- A. Cure sealants in accordance with the manufacturer's instructions to attain maximum durability and adhesion to glass and framing as soon as possible.
- B. Remove and replace any glass which has become broken, cracked, chipped, or damaged, in any way and from any source, including weather, vandalism, construction, handling, accidents during the construction period, etc.
- C. Maintain glass in a reasonably clean condition during construction so that it will not become stained and will not contribute to the deterioration of glazing materials.
- D. Remove labels, clean and polish glass on both faces prior to final inspection. Comply with instructions and recommendations of the glass manufacturer and glazing materials manufacturer for cleaning in each case.

3.04 TESTING OF EXTERIOR GLAZING SYSTEMS

A. After completion of exterior glazing and nominal curing of sealants, perpendicularly from a 3/4" hose at normal domestic water pressure, test each exterior glazing unit. Repair leaks and other defects, and retest as directed. Repair or replace other work damaged by such leaks.

SUBMITTAL CHECKLIST

- 1. Manufacturer's Literature.
- 2. Samples.
- 3. Warranty.

SECTION 08910 - GLAZED ALUMINUM CURTAIN WALL

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the outside glazed aluminum curtain wall as shown on the Drawings and specified herein.
 - B. All products for the system listed in this specification shall be of a single manufacturer.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 08410 - Aluminum Entrances and Storefronts Section 07900 – Joint Sealers Section 08710- Finish Hardware Section 08800 - Glass and Glazing
- 1.03 QUALITY ASSURANCE
 - A. Comply with all Federal, State and Local building codes and regulations.
 - B. Thermal Performance:
 - 1. AAMA Test Procedure 1502.7.
 - 2. Condensation Resistance Factor (CRF) of 43 (min.) at equivalent of 15 MPH wind velocity.
 - C. Air Infiltration:
 - 1. ASTM E283.
 - Maximum infiltration .06 CFM/ft. crack length under static pressure of 6.24 PSF (equivalent of 50 MPH wind velocity).
 - D. Water Infiltration:
 - 1. ASTM E331.
 - 2. No water penetration for 15 minutes with 5 gal./hr./s.f. at 15.0 PSF pressure.
 - E. Uniform Load Deflection Test:
 - 1. ASTM E-330.
 - 2. Max. 1/175 deflection, no permanent deformation under a load of 25 PSF positive or negative.
 - F. Uniform Load Structural Test:
 - 1. ASTM E-330.
 - 2. Load pressure of 37.5 PSF
 - 3. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, curtain wall parts, or any other damage which would cause the curtain wall to be defective.

1.04 <u>SUBMITTALS</u>

- A. Shop Drawings:
 - 1. Submit complete shop drawings prior to fabrication.
 - 2. Indicate metal thickness, construction, installation and anchorage details.
- B. Samples:
 - 1. Section of window wall assembly with glass.
 - 2. If finish is selected, submit sample of finish indicated.
 - If not indicated, submit color and finish samples for selection by the Architect, from manufacturer's entire standard selection.

C. Test Reports:

- 1. Submit test reports certified by the mullion manufacturer=s testing laboratory.
- 2. Show compliance with performance requirements.
- D. Warranty:
 - 1. Submit warranty as specified herein.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver, handle and store doors and frames at the job site in such a manner as to prevent damage.
- B. Remove all damaged or otherwise unsuitable doors and frames from the job site.

1.06 WARRANTY

- A. Provide written manufacturer's warranty of the performance of the total curtain wall system for a period of two (2) years. This includes glass, insulated glazing units, anchorage and setting system, sealing, flashing, etc. as it relates to air, water, and structural adequacy and specifications.
- B. Any deficiencies due to such elements not meeting the specifications shall be corrected by the contractor at his expense during the warranty period.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide thermal barrier type mullion glazed aluminum curtain wall system, to be approved by the Architect, as manufactured by one of the following approved manufacturers:
 - 1. "EFCO"
 - 2. "Kawneer"
 - 3. "Tubelite"
 - 4. "Vistawall"
 - 5. "United States Aluminum"
 - 6. "Traco"
 - 7. "Wausau Window and Wall Systems"
 - 8. "Arch Aluminum and Glass"
 - 9. "YKK AP"
 - 10. "Manko Window Systems"
 - 11. "Graham Architectural Products"
- B. Clarification that any/all aluminum window, curtain walls and entrances and storefronts in the scope of work are to all be provided by a single source manufacturer for the entire project.
- C. Basis of Specification:
 - 1. Window Wall Systems:
 - a. "EFCO", 5600 Series.

2.02 MATERIALS

- A. Aluminum Extrusions:
 - 1. Alloy 6063-T5 or T6.
- B. Dissimilar Metals:
 - 1. All dissimilar metals must be properly insulated to prevent galvanic action.
- C. Fasteners and Anchors:
 - 1. Stainless steel or aluminum, finish to match extrusions at exposed fasteners.

GLAZED ALUMINUM CURTAIN WALL

D. Glass:

- 1. 1 inch insulating glass for all exterior glass applications.
- 2. 1/4 inch glass for all interior applications, and all door units.
- 3. See Section 08800 for glass specifications.
- E. Thermal Barrier:
 - 1. Extruded PVC used as an applied thermal isolator.

2.03 FABRICATION

- A. General:
 - 1. Vertical and horizontal framing members to be 1/8 inch minimum wall thickness.

B. Frame:

- 1. Frame components shall be mechanically fastened by means of extruded aluminum shear blocks attached to vertical mullions.
- 2. Curtain wall system shall be able to accommodate separate interior and exterior finishes and colors.

C. Glazing:

1. Outside glazed curtain wall system shall be dry glazed with an exterior aluminum pressure plate and snap cover with interior and exterior dense EPDM preset gaskets.

D. Finish:

- 1. Base Bid: Class 1, Clear Anodic Coating, AA-M10C22A41. **OB**
- 2. Alternate No. 4: Kynar 500 polyvinylidene fluoride (PVF) two-part resinous coating with 20 year warranty. Color to be selected from manufacturer's entire standard selection.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Examine all surfaces of opening and verify dimensions.
- B. Installation of frames constitutes acceptance of the existing conditions.

3.02 INSTALLATION

- A. Install curtain walls, doors and hardware in accordance with approved shop drawings and manufacturer's instructions.
- B. Assemble and anchor the various components to allow for expansion and contraction, maintaining a watertight condition.
- C. In general, for field assembly, conform to welding and joining requirements specified for shop fabrication.
- D. Install items plumb, straight, square, level and in their proper elevation, plane and location, and in proper alignment with other work. Employ only skilled workmen and erection.
- E. Install doors plumb and in alignment with frames. Apply hardware in accordance with hardware manufacturer's instructions. Drill and tap for machine screws. Adjust door installation for free and easy movement with uniform clearances and contact at stops.
- F. Use shims as required.

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- G. Caulk perimeter after all lime, mortar, plaster and other corrosive materials have been removed from aluminum surface with solvents not harmful to finish. Provide backer rods as required.
- H. Install glass in window walls in accordance with recommendations of the mullion system manufacturer and requirements specified in Section 08800.

SUBMITTAL CHECKLIST

- 1. Shop Drawings.
- 2. Samples.
- 3. Test Reports.
- 4. Warranty.

SECTION 09251 - GYPSUM DRYWALL - WOOD STUD CONSTRUCTION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Gypsum wallboard and gypsum drywall finish and as shown on the Drawings and specified herein.
- B. Exterior sheathing products where not specifically specified elsewhere.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 06100 - Rough Carpentry. Section 06161 - Insulated Sheathing Section 07200 - Insulation. Section 08110 - Steel Doors and Frames. Section 09900 - Painting.

1.03 QUALITY ASSURANCE

- A. Gypsum wallboard construction shall comply with all laws, ordinances, rules, regulations and orders of public authorities having jurisdiction.
- B. All material shall be from a single manufacturer.

1.04 <u>REFERENCES</u>

- A. Comply with applicable requirements of ANSI/ASTM C 840 for application and finishing of gypsum board, unless otherwise indicated.
- B. Gypsum board terminology standard: GA-505 by Gypsum Association.

1.05 DELIVERY, STORAGE AND HANDLING

A. All materials shall be delivered to the job in their original, unopened containers or bundles, stored in a place providing protection from damage and exposure to the elements. Remove damaged or otherwise unsuitable material from the job site.

1.06 <u>SUBMITTALS</u>

A. Product Data:

Manufacturer's literature, materials description, cutsheets and recommended installation instructions for systems use.

PART 2 - PRODUCTS

2.01 <u>GYPSUM BOARD</u>

- A. Gypsum Board (Non-Fire Rated Assemblies):
 - 1. Provide one of the following approved products:
 - a. "Georgia-Pacific", Gypsum Sheathing.
 - b. "USG", Gypsum Board.
 - 2. Manufacture to meet specifications for FS SS-L-30, ASTM C 36 and ASTM C 1396.
 - 3. Provide in maximum lengths available to minimize end-to-end butt joints.
 - 4. Standard type, regular gypsum core gypsum board for all areas, except as otherwise indicated. If needed for specified thickness, provide product in Type X gypsum core.
 - 5. Thickness: 5/8 inch or 1/2", as indicated on the Drawings.
 - 6. Width: 4 feet.
 - 7. Length: 8 feet minimum.
 - 8. Edges: Tapered.

- B. Gypsum Board (Fire Rated Assemblies-Type X):
 - 1. Provide one of the following approved products:
 - a. "Georgia-Pacific", Type X Gypsum Sheathing.
 - b. "USG", Type X Gypsum Board.
 - 2. Manufacture to meet specifications for FS SS-L-30, ASTM C 36 and ASTM C 1396.
 - 3. Provide in maximum lengths available to minimize end-to-end butt joints.
 - 4. Type X gypsum core gypsum board.
 - 5. Thickness: 5/8 inch.
 - 6. Width: 4 feet.
 - 7. Length: 8 feet minimum.
 - 8. Edges: Tapered.
- C. Gypsum Board (Fire Rated Assemblies-Type C):
 - 1. Provide one of the following approved products:
 - a. "Georgia-Pacific", Type C Gypsum Board.
 - b. "USG", Type C Gypsum Board.
 - 2. Manufacture to meet specifications for FS SS-L-30, ASTM C 36 and ASTM C 1396.
 - 3. Provide in maximum lengths available to minimize end-to-end butt joints.
 - 4. Type C, fire resistance mineral core rated for all fire-rated assemblies, whether indicated or not.
 - 5. Thickness: 5/8 inch or 1/2", as indicated on the Drawings.
 - 6. Width: 4 feet.
 - 7. Length: 8 feet minimum.
 - 8. Edges: Tapered.
- D. Gypsum Board (Tile Backer Board):
 - 1. Provide one of the following approved products:
 - a. "Georgia-Pacific", Dens-Shield.
 - 2. Manufacture to meet specifications for ASTM C 1178.
 - 3. Provide in maximum lengths available to minimize end-to-end butt joints.
 - 4. Thickness: 5/8 inch or 1/2", as indicated on the Drawings.
 - 5. Width: 4 feet.
 - 6. Length: 8 feet minimum.
 - 7. Edges: Square.
- E. Gypsum Board (Acoustical):
 - 1. Provide one of the following approved products:
 - a. "Quiet Soultions", "Quiet Rock" #530.
 - 2. Manufacture to meet specifications for ASTM E2126 for Class A surface flame rating.
 - 3. Manufacture to meet specifications for ASTM E90 for STC rating of 52 minimum.
 - 4. Provide in maximum lengths available to minimize end-to-end butt joints.
 - 5. Thickness: 5/8 inch or 1/2", as indicated on the Drawings.
 - 6. Width: 4 feet.
 - 7. Length: 8 feet minimum.
 - 8. Edges: Tapered.
- 2.02 WOOD STUDS
 - A. Specified in Section 06100 Rough Carpentry.

2.03 MATERIALS AND COMPONENTS

- A. Fasteners:
 - 1. Type S and S-12 screws, bugle head or pan head.
 - 2. Sized to provide 3/8 inch penetration beyond thickness of wallboard.

- B. Accessories:
 - 1. Corner reinforcements, casing beads and metal trim, fabricated from 26 gauge galvanized sheet steel with perforated flanges, designed to receive joint compound.
- C. Control Joints:
 - 1. "USG", "No. 093".
- D. Suspension System for Suspended Gypsum Board Ceiling:
 - 1. "USG/Donn", "Rigid X".
- E. Hangar Wires:
 - 1. ASTM A-641, 12 gauge, 0.475 lbs/ft.
- F. Reveals:
 - 1. "Gordon, Inc.", "Final Forms I, Series 500".
 - 2. Sizes and shapes as shown on Drawings, or if not shown, 1/2 inch wide reveal.
 - 3. Extruded aluminum.

PART 3 - EXECUTION

3.01 INSTALLATION OF WALLBOARD

- A. Single Layer Wallboard Wood Stud Partitions:
 - 1. Secure wood runners to concrete slabs with power driven anchors, spaced 24 inches o.c. maximum. Secure to concrete or block masonry foundations with anchor bolts as per the Drawings. Secure to wood decking with screw anchors or nail attachment at every stud minimum.
 - 2. Space wood studs 16 inches o.c. and locate studs at door and window frames, partition intersections and corners. Locate studs within 2 inches of all door-frame jambs and anchor to jamb and head anchor clips of frame by screw or nail attachment. Over frames a cut-to-length stud extending from door frame header to ceiling runner shall be positioned over vertical joints over door frame. Anchor all frames at jamb anchor clips, after stud and before gypsum wallboard is installed.
 - 3. Sound attenuation blankets shall be pressure-fit between studs.
 - Apply single layer wallboard face out with long dimension vertical. All abutting ends and edges shall occur over stud on different studs. Screws shall be spaced 12 inches o.c. in field of board and 8 inches o.c. staggered along vertical edges.
 - 5. Use wallboard of maximum practical lengths to minimize end joints.
 - 6. Use single panel to span entire length of width of surface where possible.
 - 7. Stagger end joints when they occur.
 - 8. Locate end joints as far as possible from center of wall or ceiling.
 - 9. Butt wallboards without forcing
 - 10. Support ends and edges of wallboard panels on framing or furring members.
- B. Wall Board Ceilings Suspended:
 - 1. Install suspension system level and true, in accordance with manufacturer's instructions, to a tolerance of 1/8 inches in 12'-0".
 - 2. Install suspension system to comply with ASTM C636. Secure only from building structural members. Locate hangers near each end and at 4'-0" along each carrying channel.
 - 3. Install fastener type and spacing per manufacturer or corrosion resistant buglehead drywall screws at 12 inches o.c. in field and 8 inches o.c. along edges; whichever is the most restrictive requirement.

- C. Attachment:
 - 1. Wallboard shall be attached to framing supports by Adhesive Screw-On Method. Continuous bead of adhesive applied to framing plus supplemental screw fasteners.
 - 2. Minimum edge clearance for mechanical fasteners: 3/8".
 - 3. Position mechanical fasteners opposite each other on adjacent ends or edges.
 - 4. Space fasteners 12" on centers along supports in ceilings and walls.
 - 5. Attach starting from center of wallboard and proceed toward outer ends and edges.
 - 6. Do not fracture wallboard face paper.
- D. Accessories:
 - 1. Corner beads shall be installed on all exterior corners attached with suitable fasteners spaced 9 inches o.c. on both sides, and shall be in single lengths unless corner exceeds standard stock lengths.
 - 2. Metal trim shall be installed over face-layer wallboard, attached with suitable fasteners shaped 9 inches o.c. and shall be in single lengths unless application length exceed standard stock lengths.
 - 3. Wallboard screws shall be applied with an electric driver.
 - 4. Provide control joints at maximum 28'-0" o.c. If additional shrinkage cracks occur, install control joints and patch cracks.
- E. Joint Treatment:
 - 1. Finish all joints and interior corners with joint tape and joint compound.
 - a. Apply joint compound sufficiently thick to hide board surface at angles and joints. Cover nail/screw heads and depressions with compound.
 - b. Apply tape, squeeze out excess compound and cover tape with compound.
 - c. When first coat has thoroughly dried apply two coats of compound, extending each coat slightly beyond previous coat. Sand to smooth, flat surface, ready for specified finish.
- F. Finish:
 - 1. Level 5 finish at all exposed areas.
 - 2. If specifically permitted by the Architect, provide
 - Level 4 finish at all exposed areas and Level 5 finish at the following conditions:
 - a. All walls indicated to receive a skim coating.
 - b. All walls scheduled to receive a highly reflective wallcovering.
 - c. All wall areas scheduled to receive a dryerase or projectable wallcovering.
 - d. All wall areas scheduled to receive a dryerase paint or chalkboard paint.
 - e. All surfaces of all drywall which is paperless, fiberglass mats, or otherwise textured.
 - 3. Level 2 finish at concealed areas (above ceilings, draftstopping).
 - 4. No textured walls or ceilings.

3.02 <u>CLEANING</u>

A. Remove soil, stain caused by drywall installation.

SUBMITTAL CHECKLIST

1. Product Data.

SECTION 09300 - TILE

PART 1 - GENERAL

1.01 SUMMARY

- A. Related Documents: General and Supplementary Conditions of the Contract, Division 1 General Requirements, and Drawings are applicable to this Section.
- B. Section Includes:
 - 1. Porcelain floor tile and base where shown on Drawings.
 - 2. Porcelain tile base where shown on Drawings.
 - 3. Porcelain wall tile where shown on Drawings.

1.02 SUBMITTALS

- A. Shop Drawings:
 - 1. Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control joints, thresholds, and setting details.
 - 2. Locate and detail expansion and control joints.
- B. Product Data:
 - 1. Manufacturer's product data sheets, cutsheets, specifications and instructions for using mortars, adhesives, and grouts.
- C. Samples:
 - 1. Tile: Submit color samples as specified on Drawings or manufacturer's entire color selection.
 - 2. Grout: Submit color samples as specified on Drawings or manufacturer's entire color selection.

1.03 QUALITY ASSURANCE

- A. Single Source Responsibility:
 - 1. Obtain each type and color tile material required from single source.
 - 2. Obtain setting and grouting materials from one manufacturer to ensure compatibility.
 - 3. Furnish a 10 year guarantee from installation material manufacturer. The guarantee is inclusive of installation materials, finish product, and labor.
- B. Manufacturer Qualifications:
 - 1. Tile: Minimum 5 years experience in manufacture of tile products.
 - 2. Setting Materials:
 - Minimum 10 years experience in manufacture of setting and grout materials specified.
 - 3. Membrane: Minimum 5 years experience in manufacture of membrane materials specified.
- C. Installer Qualifications:
 - 1. Specializing in tile work having minimum of 5 years successful documented experience with work comparable to that required for this Project.
- D. Certifications:
 - 1. Submit "Master Grade Certificate" for each type of ceramic, quarry, and paver tile in accordance with requirements of ANSI A137.1.
 - 2. Submit manufacturer's certifications that mortars, adhesives, and grouts are suitable for intended and specified use.
- E. Conform to ANSI- Recommended Standard Specifications for Ceramic Tile A137.1.

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F. Conform to TCA Ceramic Tile: The Installation Handbook.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of Section 01610.
- B. Labeling: Comply with ANSI A137.1.
- C. Deliver materials in manufacturer's unopened containers, fully identified with name, brand, type, and grade.
- D. Protect materials from contamination, dampness, freezing, or overheating in accordance with manufacturer's instructions.
- E. Broken, cracked, chipped, stained, or damaged tile will be rejected, whether built-in or not.
- F. Protect mortar and grout materials against moisture, soiling, or staining.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.
- B. Do not begin installation until building is completely enclosed and HVAC system is operating and maintaining temperature and humidity conditions consistent with "after occupancy" conditions for a minimum of 2 weeks.
- C. Maintain continuous and uniform building temperatures of not less than 50 degrees F during installation nor more than 100 degrees F.
- D. Ventilate spaces receiving tile in accordance with material manufacturers' instructions.

1.06 MAINTENANCE MATERIALS AND DATA

- A. See Specification Section 01781 Closeout Maintenance Materials.
- B. Submit maintenance data under provisions of Section 01780 Closeout Submittals.
- C. Include cleaning and maintenance methods, cleaning solutions recommended, stain removal methods, and polishes and waxes recommended.

PART 2 - PRODUCTS

- 2.01 ACCEPTABLE MANUFACTURERS
 - A. "Dal-Tile Corp."
 - B. "American Olean".
 - C. "Esmer Tile"

2.02 <u>GENERAL</u>

- A. ANSI Standards:
 - 1. Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types, compositions, and grades of tile indicated.
 - 2. Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.

- B. ANSI Standard for Tile Installation Materials:
 - 1. Comply with ANSI standard referenced with products and materials indicated for setting and grouting.

2.03 PORCELAIN TILE

- A. Porcelain Floor Tile:
 - 1. Type: As shown on Drawings.
 - 2. Size: As shown on Drawings.
 - 3. Pattern: As shown on Drawings.
 - 4. Color: As shown on Drawings.
- B. Porcelain Tile Base:
 - 1. Type: As shown on Drawings.
 - 2. Size: As shown on Drawings.
 - 3. Pattern: As shown on Drawings.
 - 4. Color: As shown on Drawings.
- C. Porcelain Wall Tile:
 - 1. Type: As shown on Drawings.
 - 2. Size: As shown on Drawings.
 - 3. Pattern: As shown on Drawings.
 - 4. Color: As shown on Drawings.

2.04 THRESHOLDS

- A. Metal Edge Strip:
 - 1. General:
 - a. Provide metal edge strip at the transition between the tile flooring to the adjacent flooring.
 - b. Equal to : "Schluter Systems" transition and edge strips.
 - 2. Size and Profile:
 - a. Bent angle profile with smooth finished edges.
 - b. Configuration as required to provide proper transition between finished surface of tile and that of the adjacent finished flooring.
 - c. Height to match the thickness of the tile, with top surface smooth and flush with the tile.
 - 3. Finish:
 - a. White zinc, aluminum or stainless steel.
 - b. Finish as selected from all manufacturer's standard selection.

2.05 TRIMMERS

A. Provide necessary caps, stops, returns, trimmers and other shapes to complete installation.

2.06 MORTAR MATERIALS - THIN SET BEDS

- A. Portland Cement With Latex Additive; Thin-Set:
 - 1. Provide one of the following acceptable products:
 - a. "Custom Building Products", CustomCrete
 - Latex Mortar Admix with site mixed Mortar or CreteMix.
 - b. "Laticrete, 4237 Latex Thin Set Mortar Additive.
 - c. "Mapei, Keracrete System, consisting of KER 303 Latex mixed with 1:1 sand/cement blend.
 - 2. Description:
 - a. Latex additive and site mixed portland cement mortar. Complying with ANSI A118.4.

2.07 MEMBRANES, PRIMERS AND SEALERS

- A. Crack Isolation and Waterproofing Membrane:
 - 1. Provide one of the following acceptable products:
 - a. "Mapei", Mapelastic 315.
 - b. "Custom Building Products", Red Gard.
 - 2. Description:
 - a. Trowel applied elastomeric compound.
 - 3. Accessories:
 - a. Preformed fiberglass mesh coving, inside and outside corners, and drain fittings.
 - b. Preformed expansion joint flashing.
- B. Concrete Slab Primers and Sealers:
 - 1. Where existing substrate is unacceptable for adhesion or bonding of new materials: Provide primers and sealers as required by flooring manufacturer to achieve the proper substrate conditions for installation of flooring.
 - 2. Scarify, shot-blast, or sand-blast floor as required at no change in bid price.

2.08 <u>GROUT</u>

- A. Portland Cement
 - 1. Provide one of the following acceptable products:
 - a. "Custom Building Products", Polyblend Sanded or Unsanded Grout.
 - 2. Dry, Portland cement-based grout with silica sand, inorganic aggregates and chemicals.
 - 3. Comply with ANSI A118.6
 - 4. Color: As indicated or to be selected by Architect from manufacturer's entire selection.
 - 5. Location: Provide for all floor and wall surfaces, unless indicated otherwise.

2.09 <u>TILE AND GROUT SEALER</u>:

- A. Sealer:
 - 1. Provide one of the following acceptable products:
 - a. "Custom Building Products", Tile Lab Surfacegard Penetrating Sealer.
 - 2. Description:
 - a. Water-based, clear.
 - b. Compatible with surfaces comprised of marble, stone, porcelain, ceramic, quarry, grout, concrete, brick, masonry and unglazed tile.
 - c. Compatible with tile manufacturer's warranty requirements.
 - d. Repel dirt, oils and stains. Resists mold and mildew.
 - e. Low odor, pH neutral and non-abrasive.
 - f. Allow moisture vapor transmission.
 - g. Rated for interior and exterior use.
- B. Stripper:
 - 1. Provide one of the following acceptable products:
 - a. "Custom Building Products", Tile Lab Heavy-Duty Cleaner and Stripper.
 - 2. To clean surfaces and strip wax and acrylic finishes.
 - 3. Apply to all surfaces in strict accordance with the manufacturer's instructions.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that areas to receive tile installed by thin bed method have wood float finish and pitched to drains.

Substrates are to be true within 1/8 inch in 10'-0" (for all tiles 18" and larger). Substrates are to be true within 1/4 inch in 10'-0" (for all tiles smaller than 18").

- B. Condition of Surfaces to Receive Tile:
 - 1. Firm, dry, clean and free of oily or waxy films, mortar and soil.
 - 2. Grounds, anchors, plugs, hangers, bucks, electrical and mechanical work in or behind tile installed.
- C. Air Temperature and Surfaces in Rooms to Receive Flooring:
 - 1. Between 60 degrees to 90 degrees F, unless otherwise recommended by manufacturers of materials being installed.

3.02 PREPARATION

- A. Clean substrates.
- B. Wet down or wash dry, dusty surfaces and remove excess water immediately prior to application of tiles.
- C. Prepare surfaces in strict accordance with instructions of manufacturer whose setting materials or additives are being used.
- D. Acid Based Cleaners: Use not permitted.
- E. Scarify concrete substrates with blast track equipment if necessary to completely remove curing compounds or other substances that would interfere with proper bond of setting materials. Clean and maintain substrate in condition required by setting material manufacturer.
- F. Do not seal substrate unless required by manufacturer.
- G. Prime substrate when required by manufacturer.
- H. Blending:
 - 1. For tile exhibiting color variations within the ranges selected during sample submittals, verify that tile has been blended in factory and packaged accordingly so that tile units taken from one package show the same range in colors as those taken from other packages and match approved samples.
 - 2. If not factory blended, either return to manufacturer or blend tiles at project site before installing.

3.03 INSTALLATION

- A. Concrete Slab Primers and Sealers:
 - 1. Install primers and sealers in accordance with manufacturers recommended installation guidelines and details.
 - 2. Apply all concrete slab primers and sealers as required to achieve an acceptable substrate for installation of flooring per flooring manufacturer's requirements. Apply when areas are ready or scheduled to receive flooring without delays to the project or schedule, and without any additional costs or change in time. If floor is required to be sandblasted, shot-blasted, scarified, or otherwise prepared, perform this work at no additional cost or change in time.
- B. Crack Isolation and Waterproofing Membrane:
 - 1. Install membrane in accordance with manufacturers recommended installation guidelines and details.
 - 2. Install membrane over cracks of up to 1/8 inch or greater in substrates. Apply a 12 inch wide strip centered on crack as crack isolation membrane.
 - 3. Install membrane with products or methods approved in writing by membrane manufacturer when joining, sealing, fastening, or adhering sheet membranes.

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- 4. Once all cracks have been addressed, install membrane to entire floor substrate as waterproofing membrane.
- 5. Flash waterproofing up adjacent walls and surfaces in accordance to manufacturer's details, full height of base.
- 6. Use preformed cove, corners, and expansion joint flashing.
- 7. Allow membrane to cure as prior to setting tile.
- 8. Do not allow construction traffic on membrane.
- 9. Flood test waterproof membranes after fully cured.
- 10. Field Quality Control water test when required.
- C. Tile Installation, General:
 - 1. Install tile materials in accordance with ANSI A137.1, other referenced ANSI and TCNA specifications, and TCNA "Handbook for Ceramic Tile Installation", except for more stringent requirements of manufacturer or these Specifications.
 - 2. Cut and fit tile tight to protrusions and vertical interruptions and treat with a compatible sealants as required. Form corners and bases neatly.
 - 3. Work tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joint watertight, without voids, cracks, excess mortar, or grout.
 - 4. Prepare surface, fit, set, bond, grout and clean in accordance with applicable requirements of ANSI standards and Tile Council of North America.
- D. Layout:
 - 1. Lay out work to pattern indicated so that full tile or joint is centered on each wall and no tile of less than half width need be used. Do not interrupt pattern through openings. Lay out tile to minimize cutting and to avoid tile less than half size.
 - 2. For heights stated in feet and inches, use courses of full tile to produce nearest attainable heights without cutting tile.
 - 3. No staggered joints will be permitted.
 - 4. Align joints in tile in both directions.
 - 5. Align joints between floor and base tile.
 - 6. Make joints between sheets of tile exactly same width as joints within sheet.
 - 7. File edges of cut tile smooth and even.
 - 8. Cut and fit tile at penetrations through tile. Do not damage visible surfaces. Carefully grind edges of tile abutting built-in items. Fit tile at outlets, piping and other penetrations so that plates, collars, or covers overlap tile.
 - 9. Extend tile work into recesses and under or behind equipment and fixtures, to form complete covering without interruptions, except as otherwise indicated. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
 - 10. Accurately form intersections and returns.
- E. Thin Set Method, Floors and Walls, ANSI-108.4, 108.5, 108.14, 108.15, 108.16:
 - 1. Apply mortar or adhesive with notched trowel using scraping motion to work material into good contact with surface to be covered. Maintain 90 percent coverage on back of tile and fully bed all corners.
 - 2. Apply only as much mortar or adhesive as can be covered within allowable windows as recommended by mortar or adhesive manufacturer or while surface is still tacky.
 - 3. When installing large tiles, ceramics or mosaics, trowel small quantity of mortar or adhesive onto back of each tile or sheet of tiles.
 - 4. Set tiles in place and rub or beat with small beating block.
 - 5. Beat or rap tile to ensure proper bond and also to level surface of tile.
 - 6. Align tile to show uniform joints and allow to set until firm.
 - 7. Clean excess mortar or adhesive from surface of tile with wet cheese cloth (not a sponge) while

mortar is fresh.

- 8. Allow face mounted tile to set until firm before removing paper and before grouting.
- 9. Sound tile after setting. Replace hollow sounding tiles.
- F. Grouting, ANSI A108.9- 108.10:
 - 1. Allow tiles to set a minimum of 48 hours before grouting.
 - 2. If bonding materials are rapid setting, follow manufacturer's recommendations.
 - 3. Install in accordance with grout manufacturer's recommendations and ANSI A108.10.
 - 4. Pack joints full and free before mortar takes initial set.
 - 5. Clean excess grout from surface with wet cheesecloth as work progresses. Do not use hydrosponges.
 - 6. Cure after grouting by covering with kraft or construction paper for 72 hours.
 - 7. Install sealant in vertical wall joints at interior corners.
- G. Sealing:
 - 1. Allow grout to fully cure, 48 hours minimum.
 - 2. Thoroughly clean and prepare all surfaces of all grout and tile with manufacturer's cleaner and stripper product. Do not use cleaners containing ammonia, acids or bleach.
 - 3. Protect from any foot or equipment traffic prior to sealing.
 - 4. Apply first coat of clear sealer to all surfaces of all grout and tile, per manufacturer's recommendations.
 - 5. Once dried, apply a second coat of clear sealer to all surfaces of all grout and tile, per manufacturer's recommendations.
 - 6. Allow sealer to fully cure between coats and after final coat prior to any foot or equipment traffic atop.
 - 7. All grout and tile surfaces to receive sealer, unless specifically indicated otherwise.
- H. Control Joints and Other Sealant Usage, ANSI-A108.1:
 - 1. Install control joints where tile abuts any/all retaining surfaces such as perimeter walls, curbs, columns, wall corners and directly over cold joints and control joints in structural surfaces conforming to architectural details.
 - 2. Install control joint in floors at spacings as indicated in TCNA Installation Handbook, unless noted otherwise.
 - 3. Rake or cut control joints through setting bed to supporting slab or structure. Keep joints free of mortar.
 - 4. Install in full accordance with TCNA Installation Handbook.
 - 5. Fill joints with self-leveling polyurethane sealant and backing material as required.
 - 6. Fill joints around toilet fixtures with white silicone sanitary sealant.
- I. Expansion Joints:
 - 1. Keep expansion joints free of mortar and grout.
 - 2. Use manufacturer's expansion joint flashing when covering expansion joints with waterproof or crack isolation membranes.
 - 3. Provide expansion joints directly over changes in material, over control and expansion joints in substrate, at juncture of floors and walls, at other restraining surfaces such as curbs, columns, bases, and wall corners, and where recommended by TCNA EJ171 Expansion Joint requirements.
 - 4. Install sealant in expansion joints.
 - 5. Provide sealant material at items penetrating tile work, unless otherwise indicated.
 - 6. Provide sealants and related materials in accordance with cited ANSI A108.1 and TCNA requirements.

3.04 ADJUSTING

A. Sound tile after setting. Replace hollow sounding units.

3.05 <u>CLEANING</u>

- A. Clean excess mortar from surface with water as work progresses. Perform cleaning while mortar is fresh and before it hardens on surfaces.
- B. Sponge and wash tile diagonally across joints. Polish with clean dry cloth
- C. Remove grout haze following recommendation of mortar additive manufacturer. Do not use acids for cleaning.
- D. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- E. Wipe all sealer from glazed surfaces or any other surface that will not accept sealer. Clean tile surfaces to remove any residue and do not allow to dry on surface.

3.06 PROTECTION

- A. Prohibit traffic from floor finish for 72 hours after installation.
- B. Where temporary use of new floors is unavoidable, supply large, flat boards or plywood panels for walkways over kraft paper.
- C. Protect work so that it will be without any evidence of damage or use at time of acceptance.

SUBMITTAL CHECKLIST

- 1. Shop Drawings.
- 2. Samples.
- 3. Manufacturer's Product Data.

SECTION 09510 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Extent of acoustical ceilings as shown and scheduled on the Drawings.
- B. Types of acoustical ceilings specified in this Section include the following:
 - 1. Acoustical panel ceilings, exposed grid suspension.

1.02 QUALITY ASSURANCE

- A. UL Fire Hazard Classification:
 - 1. Where acoustical ceilings are indicated to comply with fire hazard classification provide acoustical materials which have been tested, rated and labeled by UL for indicated ratings.
 - 2. Classification: Maximum of 25 for flame spread.
- B. Sound and Noise Classification:
 - 1. Provide systems with NRC ratings in accordance with ASTM C423 and STC ratings in accordance with AMA1-II, as tested by an independent agency.

1.03 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's product data sheets, cutsheets, specifications and installation instructions.
- B. Samples:
 - 1. Where colors are specified, submit one sample of each type of acoustical unit and suspension system member.
 - 2. Where colors are not specified, or are specified as "to be selected", submit samples showing manufacturer's full range of standard colors for each type acoustical unit and suspension system.
 - 3. Submit additional or larger samples of selected colors upon request.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to the site in manufacturers original, unopened packages, with labels intact. Store and handle to avoid damage and exposure to elements. Remove damaged or otherwise unsuitable material from job site.

1.05 MAINTENANCE MATERIALS AND DATA

- A. See Specification Section 01781 Closeout Maintenance Materials.
- B. Submit maintenance data under provisions of Section 01780 Closeout Submittals.

1.06 PROJECT CONDITIONS

A. Do not install acoustical ceilings until space is enclosed and weatherproof, and until wet-work in space is completed, and until temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide ceiling panels, as approved by the Architect, by one of the following manufacturers:
 - 1. "Armstrong"

- 2. "U.S. Gypsum" (USG)
- 3. "Celotex"
- 4. "National Gypsum Company" (NGC)
- 5. "Certainteed"
- B. Provide suspension systems from same manufacturer as the ceiling panel, as approved by the Architect, or by one of the following manufacturers:
 - 1. "Armstrong"
 - 2. "U.S. Gypsum/Donn Ceilings"
 - 3. "Chicago Metallic Corporation"

2.02 CEILING SYSTEMS

- A. Provide the following acoustical ceiling systems as indicated on the Drawings:
 - 1. Panel and Suspension System Type (Lay-in, 2'x2', Drop Edge):
 - a. Panel:
 - 1. Model: "USG", Frost #440.
 - 2. Size: 2' x 2' x 7/8".
 - 3. Edge: Shadowline Beveled.
 - 4. NRC: 0.70.
 - 5. Light Reflect: 0.85.
 - 6. Color: White.
 - b. Suspension System:
 - 1. Model: "Armstrong", Prelude XL. "USG", Donn DX/DXL.
 - 2. Profile: 2' x 2' grid, 15/16" flange.
 - 3. Material: Hot dipped galvanized.
 - 4. Color: White.

2.03 CEILING SUSPENSION MATERIALS

- A. Comply with ASTM C 635, as applicable to type of suspension system required for type of ceiling units indicated. Coordinate with other work supported by or penetrating through ceilings, including light fixtures, and HVAC equipment.
- B. Structural Class:
 - 1. Intermediate-duty system.
- C. Attachment Devices:
 - 1. Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.
- D. Hanger Wires:
 - 1. Galvanized carbon steel, ASTM A 641, soft temper, pre-stretched, yield-stress load of at least 3 times design load, but not less than 12 gauge (0.106 inch).
- E. Type of System:
 - 1. Either direct-hung or indirect hung suspension system, as required to meet performance requirements.
- F. Carrying Channels:
 - 1. 1-1/2 inch steel channels, hot-rolled or cold-rolled, not less than 0.475 lbs. per lineal ft.
- G. Edge Moldings:
 - 1. Manufacturer's standard channel molding for edges and penetrations of ceiling, with single flange of

molding exposed.

- 2. 15/16 inch minimum exposed leg, finish to match grid finish.
- H. Exposed Suspension System:
 - 1. Manufacturer's standard exposed runners, cross-runners and accessories, of double web types and profiles indicated, with exposed cross runners coped to lay flush with main runners.
 - 2. Provide uniform factory-applied finish on exposed surfaces of ceiling suspension systems, including moldings, trim and accessories.
 - 3. Manufacturer's standard baked polyester finish, low gloss, color as selected.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

- A. Furnish layouts for inserts, clips or other supports required to be installed by other trades for support of acoustical ceilings.
- B. Establish layout of acoustical units in compliance with reflected ceiling plan. Balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders.

3.02 INSTALLATION

- A. Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire resistance rating requirements as indicated, and industry standards applicable to work.
- B. Install all acoustical units with grain in one plane and direction.
- C. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members. Locate hangers near each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8 inch in 12'-0".
- D. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.
 - 1. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.
 - 2. Screw-attach moldings to substrate at intervals not over 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to tolerance of 1/8 inch in 12'-0". Miter corners accurately and connect securely.
- E. Install panels in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
- F. Install hold-down clips in areas indicated, and in areas where required by governing regulations or for fire resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.03 ADJUST AND CLEAN

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

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SUBMITTAL CHECKLIST

- 1. Product Data.
- 2. Samples.

SECTION 09575 - EPOXY TERRAZZO

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, terrazzo flooring, stair treads and landings as indicated, noted, and detailed on the drawings and specified herein.
- B. See Finish Plans for locations of terrazzo and other requirements. Drawings may also indicate specific colors, patterns and mixes to be provided.
- 1.02 <u>RELATED WORK SPECIFIED IN OTHER SECTIONS</u> Section 03300 - Cast-In-Place Concrete Section 05500 – Miscellaneous Metals

1.03 QUALIFICATIONS

- A. Supplier's Qualifications:
 - 1. Suppliers shall provide materials in accordance with NTMA standards.
- B. Acceptable Installer:
 - 1. Installer must be pre-qualified prior to bidding.
 - 2. Installer shall be a contractor member of NTMA, to perform all work in accordance with NTMA.
 - 3. Installers wishing to be included on the pre-qualified list herein shall submit qualifications in writing to the Architect no later than ten (10) days prior to the bid.

C. Pre-Qualified Installers:

- 1. American Art Mosaic and Tile Co., Inc. 737 East Murry Street; Indianapolis, IN 46227 (317) 786-2658; (317) 786-3075 fax
- Art Mosaic & Tile Co., Inc. 844 Rush Street; South Bend, IN 46601 (574) 287-8131; (574) 287-4863 fax
- 3. Blakley's Corporation 8060 East 88th Street; Indianapolis, IN 46256 (317) 842-9600; (317) 845-1064 fax
- F&M Tile & Terrazzo Co., Inc. 115 Chambeau Road; Fort Wayne, IN 46805 (260) 483-6389; (260) 483-2474 fax
- Martina Brothers Co.
 300 Scott Street; Lexington, KY 40508 (859) 255-3602; (859) 255-2075 fax
- Santarosa Mosaic & Tile Co., Inc.
 2707 Roosevelt Avenue; Indianapolis, IN 46218 (317) 632-9494; (317) 631-5567 fax
- Victory Services, Inc.
 6831 E. 32nd Street, Suite 300; Indianapolis, IN 46218 (317) 860-2940; (317) 860-2941 fax

1.04 <u>SUBMITTALS</u>

- A. Samples:
 - 1. Submit maximum of three samples, 6 inches x 6 inches for each color and type of terrazzo specified.
 - 2. Submit two 6-inch lengths of each type and kind of divider strips as specified.

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- 3. Terrazzo mix formulas including all matrix and aggregate components. Indicate manufacturer, product name and numbers, colors, sizes and percentages.
- 4. Tag samples to match identification of colors as indicated on the Drawings and Finish Schedule.
- B. Manufacturer's Literature:
 - 1. Submit manufacturer's catalog information, specifications, data sheets, MSDS bulletins.
- C. Maintenance Literature:
 - 1. Submit two copies of NTMA maintenance recommendations.
- D. Certification:
 - 1. Suppliers shall furnish certification attesting that materials meet specification requirements.
 - 2. Suppliers shall furnish properly labeled material and Material Safety Data Sheets which comply to current state and federal requirements.
- E. Shop Drawings:
 - 1. Drawings indicating layouts of all terrazzo patterns, colors and color separations, expansion joints, control joints and divider strips.
 - 2. Indicate dimensions for patterns and accents and key items.
 - 3. Detailed, fully dimensioned drawings for logos, including all colors and patterns.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials:
 - 1. Deliver materials in a manner to prevent damage to containers and/or bags.
- B. Storage of Materials:
 - 1. Store materials in a clean, dry, temperature controlled location (50 90 degrees Fahrenheit).

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u> A. Epoxy M

- Epoxy Matrix:
 - 1. Product:
 - a. "Terroxy Resin Systems", "Terroxy Epoxy Matrix".
 - 2. Description:
 - a. 3/8" nominal thickness.
 - b. Poured-in-place, pigmented, 100% solids.
 - c. Two-part matrix; mixed 5 parts A to 1 part B by volume.
 - 3. Color:
 - a. If indicated on Drawings, provide as selected by Architect.
 - If not indicated, provide as selected by Architect from manufacturer's entire standard selection.
 - 4. The product shall meet the following minimum requirements:
 - a. Neat epoxy resins mixed in accordance with manufacturer's recommendations and tested without aggregate added. All specimens cured for 7 days at 75 degrees plus or minus 2 degrees Fahrenheit and 50% plus or minus 2% R.H.
 - b. Compressive Strength:
 - Test Standards: ASTM D-695. Requirements: 15,500 psi.
 - c. Ultimate Tensile Strength:
 - Test Standards: ASTM D-638. Requirements: 5,500 psi.

- d. Tensile Elongation: Test Standards: ASTM D-638.
 - Requirements: 4% 8%.
- e. Flexural Strength: Test Standards: ASTM D-790. Requirements: 4,000 psi.
- f. Hardness:

Test Standards: ASTM D-2240. Requirements: 65-85.

- B. Base Membrane:
 - 1. Product:
 - a. "Terroxy Resin Systems", "Iso-Crack Epoxy Membrane".
 - 2. Description:
 - a. 20 mils nominal thickness.
 - b. Flexible epoxy substrate primer, 100% solids.
 - c. Roller, brush, or spray applied.
- C. Marble Chip Aggregates:
 - 1. Type:
 - a. If indicated on Drawings, provide as selected by Architect.
 - If not indicated, provide as selected by Architect from manufacturer's entire standard selection.
 - 2. Size:
 - a. If indicated on Drawings, provide as selected by Architect.
 - If not indicated, provide as selected by Architect from manufacturer's entire standard selection.
 - b. Combinations of multiple sizes may be selected by Architect to achieve a desired effect.
 - c. To conform to NTMA gradation standards.
 - 3. Mixture and Percentages:
 - a. If indicated on Drawings, provide as selected by Architect. If not indicated, provide as selected by Architect from manufacturer's entire standard selection.
 - b. Combinations of multiple mixtures and percentages may be selected by Architect to achieve a desired effect.
 - 4. Color:
 - a. If indicated on Drawings, provide as selected by Architect.
 - If not indicated, provide as selected by Architect from manufacturer's entire standard selection.
 - b. Combinations of multiple colors and may be selected by Architect to achieve a desired effect.
 - 5. Hardness according to ASTM C-241 Ha-10 minimum.
 - 6. 24 hour absorption rate not to exceed 0.75 percent.
 - 7. Chips shall contain no deleterious or foreign matter.
 - 8. Dust content less than 1% by weight.
- D. Strips:
 - 1. Stop and divider "L" strips.
 - 2. White alloy of zinc.
 - 3. 16 gauge, minimum.
 - 4. No corrosive materials allowed as any component of the strips.
 - 5. Color:
 - a. If indicated on Drawings, provide as selected by Architect.

If not indicated, provide as selected by Architect from manufacturer's entire standard selection.

b. Combinations of multiple colors may be selected by Architect to achieve a desired effect.

E. Terrazzo Cleaner:

- 1. Ph factor between 7 and 10, where applicable.
- 2. Biodegradable and phosphate free.
- 3. Provide and use in accordance with manufacturer's recommendations.
- F. Sealer:
 - 1. Product:
 - a. "Terroxy Resin Systems", "Terroxy Water Based Urethane Sealer".
 - 2. Ph factor between 7 and 10, where applicable.
 - 3. Shall not discolor or amber.
 - 4. Flash Point: ASTM D-56, 80 degrees Fahrenheit minimum, where applicable.
 - 5. Provide and use in accordance with manufacturer's recommendations.
- G. Concrete Slab Primers and Sealers:
 - 1. Where slab's moisture content exceeds required acceptable installation levels: Provide primers and sealers as required by flooring manufacturer to achieve the proper moisture content on all concrete slabs and substrates for installation of flooring.
 - 2. Where existing substrate is unacceptable for adhesion or bonding of new materials: Provide primers and sealers as required by flooring manufacturer to achieve the proper substrate conditions for installation of flooring.
 - 3. May be required as a result of phasing or scheduling or to maintain the project schedule.

2.02 <u>MIXES</u>

- A. Terrazzo Selection:
 - 1. Preliminary mixes may be indicated on the Drawings. If not indicated, the contractor and supplier must work with the Architect for selection.
 - Submit samples and mixes to Architect as trials for consideration.
 - 3. Create mockups as requested for review until selection is made, regardless of quantity.
 - 4. Architect reserves right to alter mixes for aesthetic appeal and desired mix.
- B. Proportions of Terrazzo Topping:
 - 1. Epoxy Terrazzo Topping:
 - a. In accordance with resin supplier's recommendations.
- C. Mixing of Terrazzo Topping:
 - 1. Charge and mix marble chips and epoxy resin in accordance with supplier's instructions.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine areas to receive terrazzo for:
 - 1. Defects in existing work that affect proper execution of terrazzo work.
 - 2. Deviations beyond allowable tolerances for the concrete slab work.
 - a. Sub floor not to vary more than 1/4 inch from true plane in 10 feet.
 - b. Sub floor may have curing finish atop that requires special preparation prior to installation of terrazzo flooring finish.
- B. Installation of terrazzo constitutes acceptance of slab condition by the installer.

3.02 INSTALLATION

- A. Sub Floor Preparation:
 - 1. Allow new concrete substrate to cure 28 days or prepare with a sealer or primer as required.

- 2. Prepare substrate mechanically to receive epoxy terrazzo in accordance with manufacturer's recommendations and to provide proper bonding and adhesion as is required by the specific conditions of the actual substrate in question.
- 3. Install control strips directly above control joints in sub floor.
- 4. Install divider strips as shown on drawings or as otherwise directed by Architect.
- 5. If curing agent is present on existing concrete slab, the sub floor surface must by shot blast.
- 6. Prime substrate with base membrane, <u>over all entire substrate surfaces</u>, in accordance with manufacturer's recommendations.
- 7. Allow base membrane to cure in accordance with manufacturer's recommendations.
- B. Placing Terrazzo:
 - 1. Provide mix of aggregates and matrix to blend to exactly match color and finish required.
 - 2. Place terrazzo mixture and trowel compact to a dense flat surface to top of divider strips.
 - 3. Allow to cure in accordance with manufacturer's recommendations.
- C. Finishing:
 - 1. Finish to specified nominal thickness.
 - 2. Rough Grinding:
 - a. Grind with 24 or finer grit stones or with comparable diamond plates.
 - b. Follow initial grind with 80 or finer grit stones.
 - 3. Grouting:
 - a. Cleanse floor with clean water and rinse.
 - b. Remove excess rinse water, dry and prep for void filling.
 - c. Grout surface with epoxy matrix, to seal the surface and fill voids, pores, and pinholes.
 - 4. Cure Grout:
 - a. Allow the floor to cure in accordance with manufacturer's recommendations.
 - b. Grout may be left on terrazzo until all heavy and messy work in project area is completed.
 - 5. Fine Grinding:
 - a. Intermediate grind with 80 or finer grit stones until all grout is removed from surface.
 - b. Follow intermediate grind and fine grind with 120 or finer grit stones.
 - c. Upon completion of grinding, terrazzo shall show a minimum of 70% marble chips.
 - d. Clean surface thoroughly in accordance with manufacturer's recommendations.
 - 6. Sealing:
 - a. Grouting, grinding, and polishing procedures may require repeat treatment prior to sealing if porosity remains.
 - b. Seal terrazzo <u>only</u> after being accepted by Owner and Architect.
 - c. Seal with specified polish seal in accordance with manufacturer's recommendations.
- D. Install terrazzo within rooms wall to wall. Install prior to installation of any fixed casework, equipment, or items within room, so as to be installed continuous underneath.
- E. All grinding and sanding to be accomplished via a wet grinder and wet grinding/sanding techniques. Dry grinding and sanding is only permitted by express permission of the Architect.

3.03 CLEANING AND SEALING

- A. Wash all surfaces with a neutral cleaner.
- B. Rinse with clean water and allow surface to dry.
- C. Apply sealer in accordance with manufacturer's directions.
- D. If vitrefication finishing system is specified, the terrazzo is still required to be sealed by methods specified

herein.

3.04 PROTECTION

- A. Upon completion, the work shall be ready for final inspection and acceptance by the Owner and the Architect.
- B. Protect the finished floor until Final Acceptance of the project.

SUBMITTAL CHECKLIST

- 1. Samples.
- 2. Manufacturer's Literature.
- 3. Maintenance Literature.
- 4. Certification.
- 5. Shop Drawings.

SECTION 09650 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Section Includes:
 - 1. Rubber Base.
 - 2. Luxury Vinyl Plank.
 - 3. Resilient flooring accessories.
- B. Furnish labor, materials, equipment, special tools, supervision and services required for floor preparation for tile installation.
- C. Furnish labor, materials, equipment, special tools, supervision and services required to install the products and systems complete as shown on the Drawings and/or specified herein.

1.02 SUBMITTALS

- A. Manufacturer's Literature:
 - 1. Manufacturer's product data and descriptive literature.
 - 2. Manufacturer's installation instructions.
 - 3. Manufacturer's maintenance instructions.
 - 4. Material safety data sheets.

B. Samples:

- 1. Flooring:
 - a. 3"x3" actual tiles of colors as specified on drawings. Color charts alone are not acceptable.
 - b. If color is not specified, submit samples of manufacturer's entire selection.
- 2. Base:
 - a. Full size sections of colors as specified on drawings. Color charts alone are not acceptable.
 - b. If color is not specified, submit samples of manufacturer's entire selection.

1.03 DELIVERY, STORAGE AND HANDLING

- A. Receive all products and materials as packaged by the manufacturer with manufacturer's seals and labels intact. Store materials at the job site within the building and in a dry place at least 48 hours before installing flooring materials.
- B. Store in space with temperature maintained between 65 degrees F and 90 degrees F.

1.04 MAINTENANCE MATERIALS AND DATA

- A. See Specification Section 01781 Closeout Maintenance Materials.
- B. Submit maintenance data under provisions of Section 01780 Closeout Submittals.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following approved manufacturers:
 - 1. Rubber Base:
 - a. "Johnsonite".
 - b. "Roppe".
 - c. "Flexco".

- 2. Luxury Vinyl Plank:
 - a. "The Mohawk Group"
 - b. "Patcraft"
 - c. "Shaw Contract Group"
- 2.02 MATERIALS
 - A. Rubber Base:
 - 1. FS SS-W-40A, Type I, rubber.
 - 2. 1/8" thickness, 120' rolls, coved, set-on type.
 - 3. 4" high unless otherwise shown.
 - 4. Color: as shown on Drawings.
 - B. Luxury Vinyl Plank:
 - 1. Type: as shown on Drawings.
 - 2. Size: as shown on Drawings.
 - 3. Finish: as shown on Drawings.
 - 4. Color: as shown on Drawings.
 - 5. Wear Layer Thickness: .030" Clear.
 - 6. Overall Thickness: .120"/ 3mm (nominal).
 - 7. Warranty: 20-year wear warranty.
 - C. Rubber Base Adhesive:
 - 1. Comply with recommendations of rubber base manufacturer.
 - D. Rubber or Vinyl Reducer Strips:
 - 1. 1-1/2" wide, trim to match tile thickness.
 - 2. Finish: as selected from manufacturer's entire selection.
 - E. Concrete Slab Primers and Sealers:
 - 1. Where existing substrate is unacceptable for adhesion or bonding of new materials: Provide primers and sealers as required by flooring manufacturer to achieve the proper substrate conditions for installation of flooring.
 - 2. Scarify, shot-blast, or sand-blast floor as required at no change in bid price.
 - F. Leveling Compound:
 - 1. Latex type as recommended by flooring manufacturer.
 - G. Subfloor Leveler System:
 - 1. Equal to: "Johnsonite", Subfloor Leveler System.
 - 2. Resilient PVC gradual sloping ramped wedged materials.
 - 3. Provide slope, profile, and lengths as required for specific condition.

PART 3 - EXECUTION

- 3.01 PREPARATION
 - A. Spaces shall be at a minimum temperature of 70 degrees F. Temperature shall be maintained during and 48 hours after installation.
 - B. Surfaces shall meet the minimum requirements of the manufacturer of the flooring. Do not install directly over plywood. Provide luan underlayment over all plywood decks. Commencement of installation of materials constitutes acceptance of the substrates.

- C. Work shall not be started until all items penetrating the flooring have been installed.
- D. No flooring shall be installed until the installer has ascertained that the chemical treatment of substrates will not interfere with the successful application of the flooring materials.
- E. Spaces in which resilient flooring is being installed shall be closed to traffic or other work.
- F. When solvent-based adhesives are used, the space shall be ventilated; use spark proof fans if natural ventilation is inadequate. Prohibit all smoking.
- G. Before installing flooring, test concrete floor for excessive moisture by taping an 18" x 18" mat of rubber or vinyl sheet material to floor at edges with masking tape. If condensation is apparent on the underside of the sheet after 24 hours, do not install flooring.
- H. Before installing flooring, fill all cracks and holes and level depressions with underlayment compound. Surfaces shall not vary more than 1/8" in 10' in any dimension.
- I. Before installing flooring, test concrete floor for acceptable adhesion and bonding of new materials atop substrate. If proper adhesion and bonding are not apparent, do not install flooring until sealer and primer are applied. Scarify, shot-blast, or sandblast floor if required to install sealer/primer.
- J. Install floor tiles wall to wall, under all moveable casework and cabinets, under all open counter areas, and up to fixed equipment and casework.

3.02 INSTALLATION

- A. Install flooring and products in accordance with the manufacturer's recommendations.
- B. Apply all concrete slab primers and sealers as required to achieve an acceptable substrate for installation of flooring per flooring manufacturer's requirements. Apply when areas are ready or scheduled to receive flooring without delays to the project or schedule, and without any additional costs or change in time. If floor is required to be sandblasted, shot-blasted, scarified, or otherwise prepared, perform this work at no additional cost or change in time. This includes, but is not limited to, floor slabs which are not acceptable due to excessive moisture content.
- C. Install subfloor leveler at all doors and openings as required so as to maintain a smooth, flat, and true transition between these flooring materials and adjacent flooring materials.
- D. Mix and apply adhesive as recommended by the manufacturer. Lay flooring so that fields or patterns center on areas. Adjust pattern so that edge pieces shall not be less than 1/2 size. Lay flooring true to line, level, and with tight joints. Cut flooring to and around all permanent cabinets and bases. Roll flooring to assure contact and proper adhesion to substrate.
- E. Apply wall base to walls, columns, pilasters, casework, and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable with continuous wrapping outside corners, and miter cut inside corners. Do not use preformed corner pieces.
- F. Remove excessive adhesive in accordance with flooring manufacturer's instructions.
- G. Install edge strips at termination of flooring where substrate is exposed and extends beyond.

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- H. Install edge strips at doors, openings, and any and all other junctions of this flooring and adjacent flooring materials. Firmly anchor strips to subfloor with adhesive. Make transition in floor finish at centerline of door bottom or opening through wall.
- I. After installation, maintain a minimum space temperature of 55 degrees F.

3.03 LUXURY VINYL TILE POST-INSTALLATION/ INITIAL CLEANING

- A. Wait 48 hours after flooring installation before performing initial cleaning.
- B. Sweep, dust mop or vacuum the floor thoroughly to remove all loose dust, dirt, grit and debris.
- C. Remove any dried adhesive residue with a clean cloth dampened with mineral spirits.
- D. Wash thoroughly, with a cleaning solution using a pH neutral cleaner in accordance with flooring manufacturer's recommendations. The dilution ratio depends on light to heavy soil conditions.
- E. Let cleaning solution dwell for 5 to 15 minutes.
- F. Scrub the flooring using recommended floor machine equipped with manufacturers recommended pad.
- G. Remove the cleaning solution using a wet vacuum.
- H. Rinse the floor thoroughly with fresh, clean water.
- I. Remove the rinse water and allow the floor to dry completely before allowing foot traffic.
- J. Repeat the rinse process if necessary to move any visible haze.

SUBMITTAL CHECKLIST

- 1. Manufacturer's Literature.
- 2. Samples.

SECTION 09680 - CARPETING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required for floor preparation for carpet installation.
- B. Furnish labor, materials, equipment, special tools, supervision and services required to manufacture, deliver and install all carpet indicated, noted and detailed on the Drawings and as specified herein.

1.02 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Installer who can demonstrate successful experience with installations on projects of similar size and scope to this project.
- B. Requirements and Regulatory Agencies:
 - 1. Provide carpet which meets the following requirements.
 - a. Flame Spread: ASTM E84, 75 or less.
 - b. Radiant Panel Test: ASTM E648, .45 watts/CM2, or more.
 - c. Smoke Density Test: ASTM E662, 450 or less.
 - d. Pill Test: DOC FF-1-70, pass.
 - e. Meet local Fire Marshal's requirements.

1.03 <u>SUBMITTALS</u>

- A. Samples:
 - 1. Submit samples showing manufacturer's full range of standard colors for each type of carpet.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver:
 - 1. Deliver carpet in original mill wrappings with register number tabs attached or stenciled on bale.
 - 2. Do not deliver materials until installation is ready to begin.

B. Storage:

- 1. Store materials in dry, well ventilated space.
- 2. Do not store carpet rolls on end.

C. Handling:

1. Handle to protect from dirt and stains.

1.05 <u>GUARANTEE / WARRANTY</u>

- A. Warrant the following items for the lifetime of the carpet face:
 - 1. Wear: Not abrasively wear more than 10% face yarn weight under normal use.
 - 2. Static Electricity: Maintain specified levels of static electricity generation.
 - 3. Edge ravel: Will not occur under normal use.
 - 4. Delamination: Will not occur under normal use.
 - 5. Tuft Bind: Average face year tuft bind of 20 lbs.; will not zipper, wet or dry.
- B. Adjustment:
 - 1. During project guarantee period and within 15 days written notice from Owner or Architect, repair seams, edges and any other irregularity.

CARPETING

1.06 MAINTENANCE MATERIALS AND DATA

- A. See Specification Section 01781 Closeout Maintenance Materials.
- B. Submit maintenance data under provisions of Section 01780 Closeout Submittals.

PART 2 - PRODUCTS

Α.

2.01 ACCEPTABLE MANUFACTURERS

- Provide products, as approved by the Architect, from one of the following approved manufacturers:
- 1. "Patcraft"
- 2. "Shaw Contract"
- 3. "Interface"

2.02 <u>CARPET</u>

- A. Type:
 - 1. Modular Carpet Tile as indicated on the Drawings.
 - 2. Modular Walk-off Carpet Tile as indicated on the Drawings.
 - 3. Colors and patterns are to be selected by Architect from manufacturer's entire selection for the specific carpet family specified.

2.03 INSTALLATION MATERIALS

- A. Adhesive:
 - 1. Carpet Adhesive:
 - a. Per carpet manufacturer for substrate and warranty requirements.
 - b. Nonflammable.
 - 2. Seam Adhesive:
 - a. Latex base per carpet manufacturer.
- B. Concrete Slab Primers and Sealers:
 - 1. Where existing substrate is unacceptable for adhesion or bonding of new materials: Provide primers and sealers as required by flooring manufacturer to achieve the proper substrate conditions for installation of flooring.
- C. Subfloor Leveler System:
 - 1. Equal to: "Johnsonite", Subfloor Leveler System.
 - 2. Resilient PVC gradual sloping ramped wedge material.
 - 3. Provide slope, profile, and lengths as required for specific condition.
- D. Seaming Tape:
 - 1. "Orcon", Super-35.
- E. Edge Strips (direct glue-down installation):
 - 1. Extruded, anodized aluminum bar reducer at exposed edges.
 - 2. Undercut, flanged.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

Α.

- Examination: Examine surfaces scheduled to receive carpeting for:
 - 1. Defects that will adversely affect the execution and quality of work.

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- 2. Deviation beyond allowable tolerances for carpet installation over concrete as indicated in Section 03300.
- B. Conditions of Surfaces:
 - 1. Do not install carpet over concrete substrate until concrete has cured minimum of 30 days.
 - 2. Check floor moisture content. Seal inverted glass tumbler to floor with putty. If condensation forms in 48 hours, do not install carpet.
 - 3. Do not start until unsatisfactory conditions are corrected.
 - 4. Install carpeting prior to installation of movable partitions and electrical floor outlets.
- C. Prime floor slab as recommended by manufacturer.
- D. Apply all concrete slab primers and sealers as required to achieve an acceptable substrate for installation of flooring per flooring manufacturer's requirements. Apply when areas are ready or scheduled to receive flooring without delays to the project or schedule, and without any additional costs or change in time. If floor is required to be sandblasted, shot-blasted, scarified, or otherwise prepared, perform this work at no additional cost or change in time. This includes, but is not limited to, floor slabs which are not acceptable due to excessive moisture content.

3.02 INSTALLATION

- A. Install carpet in accordance with manufacturer=s instructions.
- B. Fit carpet neatly into breaks and recesses, against bases, around pipes and penetrations, under saddles and thresholds, and around permanent cabinets and equipment.
- C. Application of Adhesive:
 - 1. Mix and apply adhesives in accord with manufacturer=s instructions.
 - 2. Do not soil walls, bases, or adjacent areas with adhesive.
 - 3. Promptly remove any spillage.
- D. Roll carpet to remove air bubbles and insure bond.
- E. Install carpeting wall to wall, under all moveable casework and cabinets, under all open counter areas, and up to fixed equipment and casework.

3.04 ADJUST AND CLEAN

A. Cleaning:

- 1. Remove spots and smears of cement from carpet immediately with solvent or adhesive remover.
- 2. Remove rubbish, wrapping paper, salvages and scraps.
- 3. Upon completion, vacuum with a commercial beater bar type vacuum cleaner.
- B. Protection:
 - 1. After each area of carpet has been installed, protect from soiling and damage.
 - 2. The use of tape to hold down floor protection is prohibited.
 - 3. The use of adhesive film floor protection is prohibited.

SUBMITTAL CHECKLIST

1. Samples.

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Extent of painting work as indicated on the Drawings and specified herein including, but not limited to:
 1. Surface Inspection and Preparation.
 - 2. Paint System Schedule Exterior Paint Systems.
 - 3. Paint System Schedule Interior Paint Systems.
- B. Additional requirements of the work are to include:
 - 1. Painting and finishing of all interior and exterior items and surfaces throughout the project, except as otherwise indicated. Surface preparation, priming and costs of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.
 - 2. Field painting of exposed steel and ironwork, and primed metal surfaces of equipment installed under mechanical and electrical, except as otherwise indicated.
 - 3. Field painting of all exposed interior and exterior structural steel components, whether indicated or not on the Drawings. Includes painting of galvanized components unless noted otherwise.
 - 4. Painting of exposed mechanical, electrical equipment items as indicated on the Drawings.
 - 5. Paint exposed surfaces except where natural finish of material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint same as adjacent similar materials or areas.
 - 6. "Paint" as used herein generally refers to all coating systems material, including primers, emulsions, enamels, stains, sealers, fillers, and other applied materials whether used as prime, intermediate or finish coat.

1.02 RELATED WORK

- A. Following categories of work are <u>NOT</u> included as part of field-applied finish work specified herein, or are included in other sections of the specifications:
 - 1. Shop Priming:

Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, miscellaneous metal, and shop-fabricated or factory-built mechanical and electrical equipment or accessories.

- Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items including, but not limited to, pre-finished aluminum panels, finished mechanical and electrical equipment, light fixtures, switchgear, distribution cabinets, etc.
- Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces in concealed areas and generally inaccessible areas, such as interstitial spaces; however, doors and door frames in these spaces shall be painted.
- Finished Metal Surfaces: Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting, unless otherwise indicated.
- B. Following areas are to be included as special considerations of areas to <u>NOT</u> receive paint:
 - 1. Operating parts and labels, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, unless otherwise indicated.
 - 2. Any code-required labels, such as Underwriter's Laboratories and Factory Mutual, or any equipment identification, performance rating, name or nomenclature plates.

1.03 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's published product data sheets, specifications, materials description and technical information.
 - 2. Manufacturer's published installation and application instructions.
 - 3. Materials Safety and Data Sheets (MSDS).
- B. Samples and Draw Downs:
 - 1. If colors and finishes are indicated, submit samples boards (draw downs) for each as selected.
 - 2. If colors are not indicated, they will be selected by the Architect from manufacturer's entire selection. Submit complete range of available paint colors, either in the form of a fan set or individual color chips box set.
 - 3. If finishes are not indicated, they will be selected by the Architect from manufacturer's entire selection.
 - 4. Once colors and finishes have been chosen, submit samples boards for each color selected.
 - 5. Sample boards to be 8-1/2 inch x 11 inch cardstock, painted with actual product of color and finish as selected by the Architect. Submit one (1) of each color as selected.
- C. Mock-Ups:
 - 1. Paint on site, a test sample area of wall, 2 foot x 2 foot minimum in size. Complete test area for each color selected, for each paint system specified, and per each substrate material included, as directed by the Architect.
 - 2. Paint one (1) hollow metal door and frame complete, as directed by Architect.
 - 3. Mock-ups shall indicate color, texture and finish.
 - 4. Do not proceed with paint work until mock-ups have been approved by the Architect.
 - 5. If deemed unacceptable by the Architect, create another mock-up to correct items of unacceptability. Continue process until an approved mock-up has been achieved.
 - 6. Once an approved mock-up has been achieved, use as a standard of comparison for all work.
 - 7. Do not destroy or remove mock-up until all paint work is complete and accepted.
 - 8. Accepted mock-ups may remain as part of the work or discarded, at the discretion of the Architect.
- D. Compatibility Tests:
 - 1. Paint on site, (2) 2 foot x 2 foot minimum test sample areas of each existing and/or previously painted surface to receive new painted finish atop. Complete test area for each color selected, for each paint system specified, per each existing color of existing surface, and per each substrate material included, as directed by the Architect.
 - 2. Check for compatibility by applying the test sample of the recommended coating system as stated. Allow to dry for one week prior to testing adhesion per procedures of ASTM D3359.
 - 3. Test sample areas are to be completed by the installing contractor, reviewed and checked on site by the paint manufacturer's representative. If non-compatibility issues exist, the paint manufacturer shall provide recommendations and solutions to compatibility and/or alterations to the paint system specified.
 - 4. Submit all test results and manufacturer's approval in writing to the Architect. Painting manufacturer must certify that they approve the test results and will include the longevity and performance of the paint system in their warranty and guarantees of the paint system.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site in original, new, sealed and unopened packages and containers bearing manufacturer's name and product label.
- B. Store and protect products in strict accordance with manufacturer's recommendations and requirements.

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- C. Provide physical properties of each product to be used on the project, including:
 - 1. Weight per gallon.
 - 2. Solids by weight.
 - 3. Solids by volume.
 - 4. V.O.C. as supplied.
- D. Container labeling to include:
 - 1. Date of manufacture.
 - 2. Manufacturer's name.
 - 3. Product name, type and stock number.
 - 4. Color and finish.
 - 5. Rate of coverage.
 - 6. Application instructions for surface preparation, drying time, cleanup, mixing and reducing.
- E. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in well ventilated area, unless required otherwise by manufacturer's instructions.
- F. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 50 degrees F for twenty-four (24) hours before, during and forty-eight (48) hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paint: 50 degrees F for exterior, unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperatures for Varnish Finishes: 65 degrees F for interior and exterior, unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 foot candles measured mid-height at substrate surface.

1.06 PROJECT CONDITIONS

- A. Apply water-base paints only when temperature of surfaces to be painted and surrounding ambient air temperatures are between 60 degrees F and 85 degrees F, for at least 72 hours prior to beginning of installation, unless otherwise permitted by paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding ambient air temperatures are between 45 degrees F and 95 degrees F, for at least 72 hours prior to beginning of installation, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Maintain proper ambient air temperatures throughout entire timeframe of installation and cure period.
- D. Do not install until space is enclosed, weathertight, and ambient conditions are controlled and stabilized.
- E. Do not apply in snow, rain, fog or mist; or when relative humidity exceeds 85%; or on damp or wet surfaces.
- F. Provide adequate ventilation at all times for proper drying.

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1.07 MAINTENANCE MATERIALS AND DATA

A. See Specification Section 01781 - Closeout Maintenance Materials.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following approved manufacturers:
 - 1. "The Sherwin-Williams Company" (S-W).
 - 2. "PPG Paints" (PPG).
 - 3. "Benjamin Moore & Company" (Moore).

2.02 MATERIALS

- A. Quality:
 - 1. Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers.
 - 2. Materials not displaying manufacturer's identification as a standard, "top-of-the-line" product will not be acceptable.
- B. Compatibility:
 - 1. Provide finish coats which are compatible with prime paints used.
 - 2. Review other sections of these specifications in which prime paints or factory coats are to be provided to insure compatibility of total coatings systems for various substrates.
 - 3. Upon request from other trades, furnish information on characteristics of finish materials proposed for use, to insure compatible prime coats are used.
 - 4. Provide barrier coats over incompatible primers or remove and re-prime as required.
 - 5. Provide undercoat paint produced by same manufacturer as finish coats. Where undercoats specified are not considered by the paint manufacturer to be fully compatible with the finish coat, submit recommended undercoat substitution to Architect for acceptance. No additional cost to the Owner will be considered for such a change.
 - 6. Use only thinners approved by the paint manufacturer, and use only within recommended limits.
 - 7. Notify the Architect in writing of any anticipated problems during bidding with the use of specified coating systems with substrates primed by others.
- C. Coatings and Pigments:
 - 1. To be pure, non-fading, applicable types to suit substrates and service expectations indicated.
 - 2. Ready mixed, except field catalyzed coating.
 - 3. Pigments processed to a soft paste consistency, capable of being readily and uniformly dispersed to as a homogeneous coating.
 - 4. Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- D. Accessory Materials:
 - 1. All materials, such as linseed oil, shellac, turpentine, paint thinners, and other materials not specifically indicated but required to achieve the finishes specified.
 - 2. All of commercial quality.

PART 3 - EXECUTION

- 3.01 INSPECTION
 - A. Examine surfaces scheduled to be finished prior to commencement of work.
 - 1. Report any conditions that may potentially affect proper application.
 - 2. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.

PAINTING

- 3. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film or proper adhesion required.
- C. Beginning of installation equates to acceptance of the substrate by the contractor.

3.02 PREPARATION - GENERAL

- A. Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 - 1. Clean surfaces to be painted before applying paint or surface treatments.
 - 2. Remove oil and grease prior to mechanical cleaning.
 - 3. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly painted surfaces.
- B. Provide all scaffolding and staging required for work in this Section.
 - 1. Coordinate locations to eliminate interference with work of others.
- C. Remove hardware, hardware accessories, machined surfaces, electrical plates, lighting fixtures, trim, clocks, speakers, devices, fittings and similar items which are not to be finish-painted, prior to preparing surfaces or finishing.
- D. Provide surface-applied protection prior to surface preparation and painting operations for all adjacent areas, surfaces, or items to remain.
- E. Correct minor defects and clean surfaces which affect work of this Section.
- F. Shellac and seal marks which may bleed through surface finishes.

3.03 MATERIALS PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

3.04 SURFACE PREPARTION

- A. Uncoated Steel and Iron Surfaces:
 - 1. Clean ferrous surfaces, which are not galvanized or shop coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
 - 2. Where heaving coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent.
 - 3. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned.

B. Shop Primed Steel Surfaces:

- 1. Sand and scrape to remove loose primer and rust.
- 2. Feather edges to make touch-up patches inconspicuous.
- 3. Clean surfaces with solvent.
- 4. Prime bare steel surfaces.
- 5. Touch-up shop-applied prime coats wherever damaged or bare, and where required by other sections of these specifications. Clean and touch-up with same type shop primer.

- C. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with non-petroleum based solvent.
 - 2. Apply coat of etching primer.
- D. Unit Masonry Surfaces:
 - 1. Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter.
 - 2. Remove oil and grease with a solution of tri-sodium phosphate, rinse well and allow to dry.
 - 3. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water.
 - 4. Allow to dry.
- E. Gypsum Board Surfaces:
 - 1. Latex fill minor defects.
- F. Plaster Surfaces:
 - 1. Fill hairline cracks, small holes, and imperfections with latex patching plaster.
 - 2. Make smooth and flush with adjacent surfaces.
 - 3. Wash and neutralize high alkali surfaces.
- G. Wood Doors, Metal Doors and Metal Frames:
 - 1. Apply one coat of paint to glazing stops and rabbets prior to glazing.
- H. Insulated Coverings:
 - 1. Remove dirt, grease and oil from canvas and cotton.
- I. New Wood:
 - 1. Prime, stain or seal wood required to be job-painted, immediately upon delivery to job.
 - 2. Prime edges, ends, faces, undersides, and backsides of such wood.
- J. Hand Tool Cleaning:
 - 1. Hand tool cleaning removes all loose mill scale, loose rust, and other detrimental foreign matter. It is not intended that adherent mill scale, rust and paint be removed by this process.
 - 2. Mill scale, rust and paint are considered adherent if they cannot be removed by lifting with a dull putty knife.
 - Prior to hand tool cleaning, remove visible oil, grease, soluble residues and salts by the methods outlined in the "Steel Structures Paint Council Surface Preparation Specification No. 2 (SSPC-SP1 and SSPC-SP2).

3.05 PROTECTION

- A. Protect elements surrounding the work of this Section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.

3.06 APPLICATION

- A. General:
 - 1. Apply paint and coatings in strict accordance with manufacturer's published directions. Apply all coatings at manufacturer's recommended spreading rates per coat to provide finished wet mil and dry mil coverage per coat between the minimum and maximum microns indicated.

- 2. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
- 3. Paint surfaces behind movable equipment same as similar exposed surfaces.
- 4. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
- 5. Sand lightly between each succeeding enamel or varnish coat.
- 6. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.
- B. Scheduling Painting:
 - 1. Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
 - 2. Allow sufficient time between successive coatings to permit proper drying.
 - 3. Do not apply finishes to surfaces that are not dry.
- C. Technique:
 - 1. Apply each coat to uniform finish.
 - 2. Apply each coat of paint slightly darker than preceding coat, unless otherwise approved.
 - 3. Sand lightly between coats to achieve required finish.
 - 4. Allow applied coat to dry before next coat is applied.
- D. Apply paint as recommended by the manufacturer and as approved by the Architect:
 - 1. Apply final coat to concrete, masonry and smooth finished wall and ceiling surfaces with roller.
 - 2. Apply paint to exposed ceiling surfaces and in inaccessible areas by spraying.
 - 3. Do not use spray application on other areas without written approval of Architect.
 - 4. Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or if not indicated, as recommended by coating manufacturer.
- E. Draw lines of demarcation between different shades or colors to eliminate blurred edges.
- F. Back-prime all surfaces of interior and exterior wood blocking and woodwork, except pressure treated wood, with one coat of aluminum paint.
- G. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
- H. Where clear finishes are required, tint fillers to match wood.
 - 1. Work fillers into the grain before set.
 - 2. Wipe excess from surface.
- I. Coat steel items that come in contact with aluminum items with a field coat of bituminous paint.
- J. Mechanical and Electrical Work:
 - 1. Painting of mechanical and electrical work is limited to those items exposed in finished occupied spaces.
 - 2. Mechanical items to be painted include, but are not limited to, ducts, diffusers, piping, pipe hangers, supports and accessory items.
 - 3. Electrical items to be painted include, but are not limited to, the following:
 - a. Conduit and fittings (In finished areas only, unless otherwise indicated).
 - b. Switchgear (In Finished areas only, unless otherwise indicated).

- K. Paint all exposed ceiling construction, including joists, structural members, metal deck and all exposed conduit, pipes, pipe covering and ductwork in these ceiling areas.
- L. Seal, stain and varnish concealed and semi-concealed surfaces of millwork items.
 - 1. Seal internal surfaces of millwork items with two coats of shellac.
 - 2. Brush apply only.
- M. Prime Coats:
 - 1. Apply prime coat of material which is required to be painted or finished, and which has not been prime coated by others.
 - 2. Re-coat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- N. Pigmented (Opaque) Finishes:
 - 1. Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.
 - 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- O. Completed Work:
 - 1. Match approved samples for color, texture and coverage.
 - 2. Remove, refinish or repaint work not in compliance with specified requirements.

3.07 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Paint shop primed equipment.
- B. Touch up marred or damaged shop prefinished items.
- C. Remove unfinished louvers, grilles, covers and access panels on mechanical and electrical components and paint separately.
- D. Replace identification markings on mechanical or electrical equipment when painted accidentally.
- E. Paint interior surfaces of air ducts and convector and heating cabinets that are visible through grilles and louvers with one coat of flat black paint, to limit sight line.
 - 1. Paint dampers exposed behind louvers, grilles, and convector and heating to match face panels.
- F. Paint exposed conduit and electrical equipment occurring in finished areas.
- G. Paint both sides and all edges of plywood backboards for electrical and telephone equipment with one coat of light to medium gray paint before installation of equipment.
- H. Reinstall electrical plates, hardware, light fixture trim, clocks, speakers and fittings removed prior to finishing.
- I. Paint all equipment located on roofs, including aluminum exhaust fans, gravity relief vents, appliance exhausts and all equipment unless factory finish is acceptable to Architect.
- J. Refer to Division 15 and Division 16 for schedule of color coding and identification banding of equipment, ductwork, piping and conduit.

3.08 CLEANING AND PROTECTION

A. As work proceeds, promptly remove paint where spilled, splashed or spattered.

- B. During progress of work maintain premises free of unnecessary accumulation of tools, equipment, surplus material and debris.
- C. Collect cotton waste, cloths and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
- D. During progress of work remove from site discarded paint materials, rubbish, cans and rags at end of each work day. DISPOSE OF ALL MATERIALS IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL REGULATIONS.
- E. Upon completion of painting work, clean window glass and other paint-spattered surfaces.
- F. Protection:
 - 1. Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting.
 - 2. Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
 - 3. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.09 PAINT SYSTEM SCHEDULE - EXTERIOR PAINT SYSTEMS

- A. **STEEL, UNPRIMED** (exterior, new construction, painted finish):
 - 1st Coat Rust-Inhibitive Metal Primer
 - "S-W, Kem Bond HS, Universal Metal Primer"

*Color selected as most appropriate beneath finish topcoats.

2nd Coat - Urethane Alkyd Topcoat

"S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss"

3rd Coat - Urethane Alkyd Topcoat

"S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" *Not less than 3.0 mils dry film thickness.

B. **STEEL, SHOP PRIMED** (exterior, new construction, painted finish):

Touch-Up - Rust-Inhibitive Metal Primer

- "S-W, Kem Bond HS, Universal Metal Primer"
- *May use original primer if available.
- *Color selected as most appropriate to match primer.
- 2nd Coat Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss"
- 3rd Coat Urethane Alkyd Topcoat
 - "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" *Not less than 3.0 mils dry film thickness.

C. STEEL, GALVANIZED (exterior, new construction, painted finish): 1st Coat - Universal Primer "S-W, PRO Industrial, Pro-Cryl, Universal Primer, B66A00310" *Grav. 2nd Coat - 100% Acrylic Emulsion "S-W, Metalatex, Semi-Gloss Coating, B42W00111" 100% Acrylic Emulsion 3rd Coat -"S-W, Metalatex, Semi-Gloss Coating, B42W00111" *Not less than 3.0 mils dry film thickness. D. METAL DOORS AND FRAMES (exterior, new construction, painted finish): Touch-Up - Rust-Inhibitive Metal Primer "S-W. Kem Bond HS. Universal Metal Primer" *May use original primer if available. *Color selected as most appropriate to match primer. 2nd Coat -Urethane Alkvd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" 3rd Coat -Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" *Not less than 3.0 mils dry film thickness. *Additional coats as required by Architect to achieve desired and intended result. E. **EXTERIOR SYNTHETIC TRIM** (exterior, new construction, painted finish): Primer -Factory-applied 2nd Coat – Exterior Latex "S-W, Exterior Latex, A-100, Gloss" 3rd Coat – Exterior Latex "S-W, Exterior Latex, A-100, Gloss" *Additional coats as required by Architect to achieve desired and intended result.

3.10 PAINT SYSTEM SCHEDULE - INTERIOR PAINT SYSTEMS Α.

CONCRETE MASONRY UNITS (interior, new construction, painted finish):

Acrylic Block Filler 1st Coat -

"S-W, Heavy-Duty Block Filler, Interior/Exterior Acrylic, B42W46" *Apply filler coat at a rate to ensure complete coverage with pores filled.

2nd Coat - Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Eg-Shel"

3rd Coat -Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Eg-Shel"

PAINTING

B. **POURED CONCRETE STAIR ENCLOSURES** (interior, new construction, painted finish):

1st Coat - 100% Acrylic Emulsion Conditioner

"S-W, Loxon Conditioner, A24-100 Series" *Tinted toward final color

Timed toward linal color.

2nd Coat - Acrylic Block Filler

"S-W, Heavy-Duty Block Filler, Interior/Exterior Acrylic, B42W46" *Apply filler coat at a rate to ensure complete coverage with pores filled.

3rd Coat - Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Eg-Shel"

4th Coat - Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Eg-Shel"

C. **GYPSUM DRYWALL / PLASTER WALL SURFACES** (interior, new construction, painted finish):

1st Coat - Latex Primer

"S-W, ProMar 200 Zero VOC, Interior Latex Primer, B28W02600" *Tinted toward final color.

2nd Coat - Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Eg-Shel"

3rd Coat - Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Eg-Shel"

D. **GYPSUM DRYWALL / PLASTER CEILING AND SOFFIT SURFACES** (interior, new construction, painted finish):

1st Coat - Latex Primer

"S-W, PrepRite ProBloc, Interior/Exterior Latex Primer/Sealer, B28W02600" *Painter responsible to visit site and field verify surface prep required.

*Additional coats as required to cover existing color and texture.

2nd Coat - Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Flat "

3rd Coat - Interior Latex Topcoat "S-W, ProMar 200 Zero VOC, Interior Latex, Flat "

E. **STEEL, UNPRIMED** (interior, new construction, painted finish):

1st Coat - Rust-Inhibitive Metal Primer

"S-W, Kem Bond HS, Universal Metal Primer"

*Color selected as most appropriate beneath finish topcoats.

2nd Coat - Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss"

3rd Coat - Urethane Alkyd Topcoat
 "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss"
 *Not less than 3.0 mils dry film thickness.

PAINTING

- F. STEEL, SHOP PRIMED (interior, new construction, painted finish): Touch-Up - Rust-Inhibitive Metal Primer "S-W, Kem Bond HS, Universal Metal Primer" *May use original primer if available. *Color selected as most appropriate to match primer. 2nd Coat - Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" 3rd Coat -Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" *Not less than 3.0 mils dry film thickness. G. STEEL, GALVANIZED (interior, new construction, painted finish): Solvent-Based Acrylic Coating 1st Coat -"S-W, Galvite HS, B50WZ30" 2nd Coat -Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" 3rd Coat -Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" *Not less than 3.0 mils dry film thickness. METAL DOORS AND FRAMES (interior, new construction, painted finish): Η. Touch-Up - Rust-Inhibitive Metal Primer "S-W, Kem Bond HS, Universal Metal Primer" *May use original primer if available. *Color selected as most appropriate to match primer. 2nd Coat - Urethane Alkyd Topcoat "S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" Urethane Alkyd Topcoat 3rd Coat -"S-W, Industrial Urethane Alkyd Enamel, B54-150 Series, Gloss" *Not less than 3.0 mils dry film thickness.
 - *Additional coats as required by Architect to achieve desired and intended result.

SUBMITTAL CHECKLIST

- 1. Product Data.
- 2. Samples and Draw Downs.
- 3. Mock-Ups.
- 4. Compatibility Tests.

SECTION 10430 - EXTERIOR SIGNS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Exterior signage as indicated on the Drawings and specified herein, including:
 1. Pre-finished metal lettering.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 10440 - Interior Signs

1.03 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Submit manufacturer's product data, cutsheets, specifications and installation details to illustrate conformance with the specifications and for selection and/or verification of all sign layout and construction items.
- B. Signage Layout:
 - 1. Provide initial layout of signage and lettering, including the actual spacing and layout required for the surface to be installed on.
 - 2. Draw and indicate layout to scale, with field verified measurements included.
- C. Mounting Template:
 - 1. Once a final layout has been approved, supplier shall provide the Contractor with a full scale mounting template for proper positioning of studs and fasteners.
- D. Samples:
 - 1. Submit actual samples of colors as specified. Color charts alone are not acceptable.
 - 2. If not specified, submit samples of manufacturer's entire selection.
 - 3. Submit additional actual color samples as requested for selection of verification.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store letters in manufacturer's protective packaging.
- B. Handle letters so as to prevent damage to finish.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Cut Metal Lettering:
 - 1. Basis of Specification: "ASI Sign Systems", LPS Series.
 - 2. Material: Aluminum, 3003 H14 alloy.
 - 3. Thickness: 1/4", sawn.
 - 4. Text: As indicated on Drawings.
 - 5. Size: As indicated on Drawings.
 - 6. Font: As indicated on Drawings, or as selected from all manufacturer's standard fonts. Custom made fonts or typestyle may be required if indicated.
 - 7. Finish: Baked enamel finish as indicated on Drawings.
 - If not indicated, color and finish to be selected from manufacturer's entire standard color range.
 - 8. Mounting: Spacers for 1/2" stand-off.
 - 9. Fasteners: Manufacturer's standard concealed anchoring device for wall type.
 - 10. Setting Cement: As recommended by manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Masonry Wall:
 - 1. Drill 3/16" x 1-1/2" deep holes directly in masonry wall.
 - 2. Set pins in grout.
 - 3. Mount letters projected from masonry. Use spacing collars.
- B. Stud Wall or Furred Channels:
 - 1. Drill and tap directly into studs whenever possible.
 - 2. Anchors and pins to be by manufacturer of self-securing type for use in a hollow wall condition. Provide as required to properly secure signage in place.
 - 3. Mount letters projected from wall. Use spacing collars.

SUBMITTAL CHECK LIST

- 1. Manufacturer's Literature.
- 2. Signage Layout.
- 3. Mounting Template.
- 4. Samples.

SECTION 10440 - INTERIOR SIGNS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Interior signage as indicated on the Drawings and specified herein, including:
 1. Non-illuminated room identification signs.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> A. Section 10430 - Exterior Signs

1.03 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's product data, cutsheets, specifications and installation details to illustrate conformance with the specifications and for selection and/or verification of all sign layout and construction items.
- B. Signage Layout:
 - 1. Provide initial layout of signage and lettering, including the actual spacing and layout required for the surface to be installed on.
 - 2. Draw and indicate layout to scale, with field verified measurements included.
- C. Mounting Template:
 - 1. Once a final layout has been approved, supplier shall provide the Contractor with a full scale mounting template for proper positioning of studs and fasteners.
- D. Samples:
 - 1. Submit full size samples of actual sign for each type specified.
 - 2. Submit full size paper template of dimensional lettering signs.
 - 3. Submit color charts for color selections.
 - 4. Submit actual color and finish samples as requested for selection of verification.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver signs in manufacturer's unopened packages, with labels intact.
- B. Store and handle letters so as to prevent damage or deterioration.

PART 2 – PRODUCTS

2.01 ROOM IDENTIFICATION SIGNS

- A. Typical Flat Wall Signs:
 - 1. Basis of Specifications: "ASI Sign Systems", InTouch.
- B. Type of Graphics:
 - 1. .080" thick matt acrylic faceplate laminated to a .080" thick acrylic back.
 - 2. Raised etched tactile letters welded to front surface of plaque.
 - 3. Letters and numerals shall also be included in raised braille, color same as background.
 - 4. Copy to be centered, unless indicated otherwise.
 - 5. Signs are to be unframed.
 - 6. Typeface: Uppercase 3/4" high; 1-1/2" numerals shall be used for all room numbers.
 - 7. Font: As selected from manufacturer's entire standard selection.

INTERIOR SIGNS

THE VILLAGE @ WEST JEFFERSON Louisville, Kentucky

- 8. 1/2" square corners.
- 9. Sizes: As shown on Drawings.

2.02 <u>COORDINATION</u>

A. Colors shall be selected from manufacturer's entire standard selection, panel and type.

- B. Room numbers to be determined during shop drawing submittals, unless otherwise indicated.
- C. Blank Back Plate:
 - 1. Flat and smooth panel.
 - 2. Material and color to match plaque.
 - 3. Size to match plaque.
 - 4. Provide for any sign where plaques need to be installed on a glass sidelight, transom or window, or where backside and/or mounting is otherwise exposed to view. Provide when and where directed by Architect, whether indicated or not, for location of sign installation designated.
- D. Field verify all locations of signs with Architect prior to mounting. Relocate as required.

2.03 TYPES OF SIGNS

- A. The following signs shall be provided throughout the project, whether indicated or not:
 - 1. All restrooms shall be identified by room name, pictogram, and universal symbol of accessibility.
 - 2. All janitorial and custodial rooms shall be identified by "Custodial", unless otherwise indicated.
 - 3. All mechanical and utility rooms shall be identified by "Mechanical", unless otherwise indicated.
 - 4. All electrical rooms shall be identified by "Electrical", unless otherwise indicated.
 - 5. All fire extinguishers shall be identified by universal symbol for extinguisher.
 - 6. All egress stairways shall have sign stating, "Stair" and include the universal symbol for a stairway.
 - 7. All elevators shall have sign stating, "In Case of Fire Do Not Use Elevator" and include the universal symbol for a person using the stairway.
 - 8. All elevator equipment rooms shall have sign stating, "Elevator Equipment Room. Storage Within Is Prohibited. By Order of the State Building Code".
 - 9. Typical sign elevations are indicated on Drawings. See miscellaneous details on Drawings.

2.09 SIGN SCHEDULE (ROOM IDENTIFICATION SIGNS)

A. Sign Type: "A"

Location: Lobby 114, Stair A, Stair B, Suite 201, Suite 103, Suite 201, Suite 207. Location to receive (2) signs per space: Suite 101, Suite 102, Suite 103, Suite 104, Suite 105, Suite 106, Suite 107, Suite 202, Suite 203, Suite 204, Suite 205, Suite 206. Text: As shown on elevations

Sign Type: "B"

Location: Adjacent to Mech. Room at Suite 101, Suite 102, Suite 103, Suite 104, Suite 105, Suite 106, Suite 107, Suite 201, Suite 202, Suite 203, Suite 204, Suite 205, Suite 206, Suite 207. Text: As shown on elevations

Sign Type: "C" Location: Adjacent to Elevator at Lobby 114, Lobby 215. Text: As shown on elevations

Sign Type: "D" Location: Adjacent to Elevator Equipment Room at Lobby 114. Text: As shown on elevations Sign Type: "E"

Location: Adjacent to Restroom at Suite 101, Suite 102, Suite 103, Suite 104, Suite 105, Suite 106, Suite 107, Suite 201, Suite 202, Suite 203, Suite 204, Suite 205, Suite 206, Suite 207. Text: As shown on elevations

Sign Type: "F" Location: Adjacent to Stairs at Lobby 114, Lobby 215, Corridor 232. Text: As shown on elevations

Sign Type: "G" Location: Adjacent to Fire Extinguisher at Lobby 114, Covered Walkway 123b, Corridor 205, Corridor 214, Corridor 232, Text: As shown on elevations

Sign Type: "H" Location: Refer to Door Hardware Specification Section 08710 Text: Refer to Door Hardware Specification Section 08710 and Sign Elevations.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install all signs square, plumb, level, and true.

- B. Adhesive Attachment:
 - 1. Install using manufacturer's standard double-click foam tape, or combination of tape and adhesive.
 - 2. Use for typical installations on gypsum board or like surfaces.
- C. Fastener Attachment:
 - 1. In addition to the adhesive method above, install one screw fastener through face of sign and into the substrate at all corners. Finish paint screw heads to match face of sign.
 - 2. Use for installations on masonry walls, exterior mounting, epoxy paint or area prone to either wet or vandal conditions.
- D. Mount sign on wall adjacent to latch side of door, unless otherwise indicated. If wall space does not permit this location, consult Architect for mounting desired.
- E. Mounting height shall be 60" above finish floor to centerline of the sign, unless otherwise indicated.
- F. Install blank back plate on opposite side of plaque where applicable.

SUBMITTAL CHECK LIST

- 1. Manufacturer's Literature.
- 2. Signage Layout.
- 3. Mounting Template.
- 4. Samples.

SECTION 10522 - FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Fire extinguishers, cabinets, and brackets as shown on the Drawings and specified herein.

1.02 QUALITY ASSURANCE

A. Provide fire extinguishers which are U.L. listed and bear U.L. "Listing Mark" for type, rating, and classification of extinguisher indicated.

1.03 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's product data sheets, cutsheets, specifications, materials description, installation and maintenance instructions.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to job in manufacturer's unopened packages with labels intact.

B. Store and handle products so as to prevent damage. Remove all damaged items from the job site.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Fire Extinguishers:
 - 1. Dry Chemical Type:
 - a. Basis of Specification: "JL Industries, Inc." Cosmic 10E.
 - b. Fire Class: ABC.
 - c. U.L. Rating: 4A-80BC.
 - d. Capacity: 10 pounds.
- B. Fire Extinguisher Cabinets:
 - 1. Use with Dry Chemical Type Extinguishers (Semi-Recessed Mounted):
 - a. Basis of Specification: "JL Industries, Inc." Academy.
 - b. Tub: Cold rolled steel with white powder coat finish.
 - c. Trim: Semi-recessed 1-1/2" square-edge trim, aluminum, clear anodized finish.
 - d. Door Style: Full glazing.
 - e. Door Glazing: Clear acrylic with red vertical FE lettering.
 - f. Hardware: Continuous hinge, roller catch, pull handle. Match trim finish.
- C. Fire Extinguisher Brackets:
 - 1. Manufacturer's standard wall mounted type for each specific extinguisher type.
 - 2. Provide to secure top and bottom of extinguisher.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install extinguishers in cabinets and on brackets as indicated on the Drawings.
- B. Install cabinets and brackets square and plumb, and in accordance with manufacturer's instructions.

- C. Install in compliance with all applicable Federal, State, and local regulations.
- D. Install cabinets recessed in masonry and stud framed walls as applicable.
- E. Locate wall brackets as indicated. Provide blocking as required for all attachment locations.
- F. Install cabinets and brackets so as to locate extinguishers at a height of 3'-8" from floor to top of extinguisher handle (for bracket mounted extinguishers) and to center of door pull (for extinguishers in a cabinet), unless otherwise indicated on the Drawings.

3.02 ADJUSTING AND CLEANING

- A. Check extinguishers for proper charge in operation.
- B. Assure that all doors and hardware operate smoothly and freely.
- C. Adjust or replace defective items as required.

3.03 PROTECTION

A. Protect cabinets and extinguishers from damage and deterioration until time of Substantial Completion. Touch up any marred surfaces.

SUBMITTAL CHECK LIST

1. Product Data.

SECTION 10800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Toilet accessories as shown on Drawings and specified herein.
- B. Installation of owner-furnished toilet accessories as shown on Drawings and specified herein.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 10160 - Metal Toilet Partitions Section 10161 - Stainless Steel Toilet Partitions Section 10165 - Laminated Plastic Toilet Partitions Section 10170 - Phenolic Core Toilet Partitions Section 10171 - Solid Plastic Toilet Partitions
- 1.03 <u>SUBMITTALS</u>
 - A. Manufacturer's Literature:
 - 1. Submit manufacturer's "cut sheets" for each item specified, showing installation details, and product information.
- 1.04 DELIVERY, STORAGE AND HANDLING
 - A. Deliver materials to job with manufacturer's unopened packages, with label in tact.
 - B. Store and handle products so as to avoid damage. Remove all damaged items from the job site.
 - C. Maintain protective covers until Substantial Completion.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following manufacturers:
 - 1. "Bobrick"
 - 2. "Bradley"
 - 3. "ASI"
 - 4. "AJW Architectural Products"
- B. See Specifications Section 01630 Product Options and Substitutions.

2.02 MATERIALS

- A. Grab Bars:
 - 1. "Bobrick" B-6806 Series.
 - 2. Surface mounted, stainless steel, safety grip finish, concealed mounting, snap-flange cover.
 - 3. Provide 1-1/2" diameter x sizes and configurations as shown on Drawings.
 - 4. Provide at locations as shown on Drawings, or if not shown, provide as follows:
 - a. 36" long horizontally on rear wall of all ADA stalls.
 - b. 42" long horizontally on side wall of all ADA stalls and ambulatory stalls.
 - c. 18" long vertically on side wall of all ADA stalls and ambulatory stalls.
- B. Toilet Paper Dispensers (Typical Height Installation):
 - 1. "Bobrick" B-4288, "Contura" Series.

- 2. Dual-roll type.
- 3. Surface-mounted, stainless steel, satin finish.
- 4. Provide at locations as shown on Drawings, or if not shown, provide one per water closet.
- 5. Coordinate location with partition door and other accessories.
- 6. Provide this type of dispenser at all typical height locations, except where other types are specifically indicated for use.
- C. Mirrors:
 - 1. "Bobrick" B-165 Series.
 - 2. 1/4" select float glass mirror with stainless steel angle frames.
 - 3. Corners welded, ground and polished smooth.
 - 4. Surface mounted, stainless steel, satin finish, concealed fasteners.
 - 5. Install centered on lavatory or sink.
 - 6. Provide sizes as shown on Drawings, or if not shown, provide 24"x36".
- D. Paper Towel Dispensers (C-Fold Type):
 - 1. "Bobrick" B-4262, "Contura" Series.
 - 2. Surface-mounted, stainless steel, satin finish, lockable.
 - 3. Provide at locations as shown on Drawings, or if not shown, provide one per restroom and one per every sink.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Finish surfaces shall be complete prior to installation of accessories.
- B. Verify all materials that anchoring devices are compatible with accessories.

3.02 INSTALLATION

- A. Drill holes of proper size for required anchoring devices to be concealed in finish wall behind accessories.
- B. Install accessories plumb and true.
- C. Grab Bars:
 - 1. Anchor grab bars on wall and partition of end toilet compartment and at urinals indicated.
 - 2. Install as recommended by manufacturer to withstand 500lb. downward pull.

3.03 MOUNTING HEIGHTS

- A. See Drawings for mounting heights.
- B. If not shown on Drawings, confer with Architect for heights required.
- C. All mounting heights shall meet all current Codes and ADA requirements.

3.04 ADJUSTING AND CLEANING

- A. Check operation of accessories; make final adjustment as required.
- B. Remove protective covers.
- C. Clean stainless steel of all paints, and other markings, with mild detergent and water.

3.05 PROTECTION

A. Protect accessories from damage until Substantial Completion.

B. Replace any damaged accessories.

SUBMITTAL CHECK LIST

1. Manufacturer's Literature.

SECTION 12502 - WINDOW SHADES

PART 1 - GENERAL

- 1.01 <u>DESCRIPTION</u>
 - A. Work covered by this section includes furnishing of and paying for all materials, labor, equipment, mounting hardware and other items required for execution and completion of roll-up fabric window shades.
 - B. Work covered by this Section includes:
 - 1. Single-Roller Window Shades, with a screen fabric shade.

1.02 <u>SUBMITTALS</u>

- A. Window Shades Schedule:
 - 1. Indicate locations, quantities and field measurements of dimensions for all window shades.
 - 2. Indicate proposed mounting and fastening procedurals.
- B. Product Data:
 - 1. Manufacturer's product data sheets, cutsheets, specifications, materials description, installation and maintenance instructions.

C. Samples:

- 1. Actual samples of all items needed for colors and finishes.
- 2. Colors and finishes to be selected by Architect from manufacturer's entire selection.

1.03 <u>DELIVERY</u>

A. Deliver materials in manufacturer's original, unopened, containers, labeled so as to allow easy identification.

1.04 WARRANTY

- A. Mounting hardware, headbox, fascia, chain and clutch operator Twenty-five (25) years.
- B. Shade Fabric Ten (10) years.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- Provide products, as approved by the Architect, from one of the following approved manufacturers:
 "Hunter Douglas Contract"
 - 2. "Draper"
 - 3. "MechoSystems"

2.02 SINGLE ROLLER WINDOW SHADES

- A. Provide one of the following approved products:
 - 1. "Hunter Douglas Contract", FR Roller Shade.
 - 2. "Draper", Flexshade.
 - 3. "MechoSystems", Mecho/5 Manual Shades.
- B. Description:
 - 1. Manually operated, vertical roll-up, fabric window shade with bead chain and clutch operating mechanism.

WINDOW SHADES

- C. Mounting Style:
 - 1. Inside of window opening and extending from head to sill and jamb to joint.
- D. Operation:
 - 1. Bead chain and clutch operating mechanism allowing shade to stop when chain is released.
 - 2. Designed never to need adjustment or lubrication.
 - 3. Provide preset limit stops to prevent shade from being raised or lowered too far.
 - 4. Clutch mechanism to be fabricated from high carbon steel and molded fiberglass reinforced polyester or injected molded nylon.
 - 5. Control loop to be stainless steel bead chain hanging at side of window.
- Ε. Color:
 - 1. As indicated on the Drawings, or if not indicated, to be selected by Architect from manufacturer's entire selection.

2.03 SCREEN FABRIC

- Basis of Specification: "DPhifer" "Sheerweave" 2000. Α.
- Β. Description:
 - 1. Interior sun control, 37% vinyl on fiberglass, 63% PVC in full basketweave.
- C. Attributes:
 - Weight: 14.26 ounces per square yard
 Thickness: .019 inches

 - 3. Roll Width: 63 inches, 98 inches or 126 inches.
 - 4. Openness: 5 percent
 - 5. Class A Fire Rating
 - 6. Bacteria and fungal resistant.
- D. Color:
 - 1. As indicated on the Drawings, or if not indicated, to be selected by Architect from manufacturer's entire selection.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION

- Contractor shall be responsible for inspection of site, approval of mounting surfaces, installation Α. conditions and field measurements for this work.
- Β. Field measure all openings and conditions.

INSTALLATION 3.02

- Install shades level and plumb, allow clearance for proper operation, and demonstrate blinds to be in Α. uniform and smooth working order.
- Α. Provide clearance between sash and shades to permit unencumbered operation of sash hardware.
- C. Isolate metal parts from concrete and mortar to prevent galvanic action.

WINDOW SHADES

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D. Protect installed units to ensure their being in operating condition, without damage, blemish, or indication of use at Substantial Completion of project. Correct non-conforming damaged unit. Replace units that cannot be field corrected.

3.03 <u>CLEANING</u>

A. Clean finished installation of dirt and finger marks. Leave work area clean and free of debris.

SUBMITTAL CHECK LIST

- 1. Window Shades Schedule.
- 2. Product Data.
- 3. Samples.

SECTION 13850 - FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This specification describes a fire detection and alarm system. The control panel, to be intelligent device addressable, analog detecting, low voltage and modular, with digital communication techniques, in full compliance with all applicable codes and standards.
- B. The Contractor shall furnish a complete system that meets or exceeds the minimum requirements, features and capacities as indicated on the Drawings and specified herein.
- C. The system shall be in full compliance with National and Local Codes and requirements.
- D. The system shall include all required hardware, piping, raceways, interconnecting wiring and software to accomplish the requirements of this specification and the contract drawings, whether or not specifically indicated.
- E. All equipment furnished shall be new and the latest state of the art products of a single manufacturer, engaged in the manufacturing and sale of analog fire detection devices for over ten years.
- F. The system as specified shall be supplied, installed, tested and approved by the local Authority Having Jurisdiction, and turned over to the Owner in a functional and operational condition.
- G. In the interest of job coordination and responsibilities, the Contractor shall contract with a single supplier for fire alarm equipment, engineering, programming, inspection and tests, and shall be capable of providing a "UL Listing Certificate" for the complete system.
- H. Furnish all labor, materials, equipment, special tools, supervision and services required.
- I. All products supplied shall be non-proprietary. Any items that are supplied or installed that are proprietary to a specific system shall be removed and replaced with non-proprietary materials at no additional costs to the Owner.

1.02 DESCRIPTION OF SYSTEM

- A. System shall be fully addressable.
- B. This section includes providing a complete and operative fire alarm system in the project as indicated on the drawings, specified herein and elsewhere required.
- C. System shall consist of control panel, remote annunciator panel, manual stations, fire alarm signals, automatic smoke and heat detectors, fan shutdown relays, conduits, boxes, wire, etc. All electrical work shall conform to applicable sections of these specifications except where specified otherwise.
- D. System shall be actuated by any automatic or manual initiating device, or the kitchen hood system, which shall immediately sound all alarm devices continuously until actuating device is restored to normal and control panel is reset. System shall automatically shut down all air supply and exhaust fans and automatically restart this equipment when the system is returned to normal. Operation of any alarm initiating device shall be indicated on its associated alarm zone and any trouble with the wiring or device shall be indicated as its associated trouble zone.

- E. System shall include an automatic dialer to send a fire alarm signal to an approved alarm receiving facility who shall notify the designated parties of the alarm condition.
- F. System shall be designed for direct-current (DC) and shall be supplied with standby battery supply and automatic battery charging system. System shall be designed for connection to a 120 volt dedicated (AC) circuit.

1.03 APPROVALS

- A. The publications listed below form a part of this publication to the extent referenced. The publications are referenced in the text by the basic destination only. The latest version of each listed publication shall be used as a guide unless the authority having jurisdiction has adopted and earlier version.
 - 1. National Fire Protection Association (NFPA)
 - a. Maintenance of Sprinkler Systems.
 - b. NFPA 70 National Electrical Code.
 - c. NFPA 72, Standard for Installation, Maintenance and use of protective signaling systems.
 - 2. American with Disabilities Act.
 - 3. Underwriters' Laboratories, Inc. (UL)
 - a. UL FPED
 - b. A.D.A. Federal Guidelines
 - 4. State and local building codes as adopted by the Authority having jurisdiction.

1.04 QUALIFICATION OF INSTALLER

- A. Before commencing work, submit data showing that the manufacturer has successfully installed fire alarm systems of the same scope, type and design as specified. The contractor shall include the names and locations of at least two installations where the manufacturer has installed such systems.
 - 1. The Contractor shall submit copies of all required licenses and bond as required in the state having jurisdiction.
 - 2. The installing contractor shall employ on staff a minimum of one NICET level 3 technician or a professional engineer, registered in the State of the project location.

1.05 QUALIFICATION OF MANUFACTURER

- A. Provide the services of a factory trained and certified representative or technician, experienced in the installation and operation of the type of system provided. The representative shall be licensed in the State if required by law. The technician shall supervise installation, software documentation, adjustment, preliminary testing, final testing and certification of the system. The technician shall provide the required instruction to the owner's personnel in the system operation and maintenance.
- B. Contractor shall maintain a factory trained service department with service personnel available on a 24 hour, 7-day per week basis. Provide a 24-hour emergency service number with a maximum telephone response time of 1 hour.
- C. Contractor shall maintain a spare parts inventory of critical function components.
- D. Contractor's personnel shall have a minimum of 2 year's experience in service and maintenance of fire detection, and alarm systems.

1.06 SUBMITTALS

- A. The Contractor shall include, at a minimum, the following information:
 - 1. Power calculations. Battery capacity calculations. Battery size shall be minimum of 125% of the calculated requirement.
 - 2. Supervisory power requirements for all equipment.

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- 3. Alarm power requirements for all equipment.
- 4. Power supply rating justification showing power requirements for each of the system power supplies. Power supplies shall be sized to furnish the total connected load in a worst-case condition plus 25% spare capacity.
- 5. Voltage drop calculations for wiring runs demonstrating worst-case condition.
- 6. Complete manufacturers catalog data including supervisory power usage, alarm power usage, physical dimensions, and finish and mounting requirements.
- 7. Complete drawings covering the following shall be submitted by the contractor for the proposed system:
 - a) The submittals shall include drawings (in CAD compatible format) showing a schematic arrangement of the system including the main control unit and all peripherals The drawing shall show the type, quantity and arrangement of all modular components within the control unit and shall indicate overall cabinet dimensions. The drawings shall show explicit details regarding the positioning and placement of all detection system components. The drawing shall also include building floor plans drawn to a minimum scale of 1/8" = 1'-0".
 - b) Floor plans shall show all equipment and raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used.
 - c) Provide a fire alarm system function matrix as referenced by NFPA 72. Matrix shall illustrate alarm input/out events in association with initiation devices. Matrix summary shall include system supervisory and trouble output functions. Include any and all departures, exceptions, variances or substitutions from these specifications and/or drawings at time of bid.
- 8. Installation drawings shop drawings, and as-built drawings shall be prepared by an individual who is experienced with the work specified herein.
- 9. Incomplete submittals shall be returned without review, unless with prior approval of the Engineer.

1.07 INSTALLATION SUPERVISION

A. Supervision:

Shall include services of factory trained technicians to supervise installation of systems during construction, to assist in the system start-up and to inspect systems during guarantee period. Make a complete inspection at the end of the guarantee period, and forward signed statement of inspection after all corrections and maintenance items have been completed, to Architect/Engineer. This report will be filed with the project records.

B. Testing:

Submit on completed of work, verification of a point-by-point check test indicating the date and time of each item inspected. Issue a certificate conforming that the inspection has been completed and the system is installed and functioning in accordance with the specifications. This report will be filed with project records and in the bound "Maintenance and Operations Manual".

1.08 SERVICE GUARANTEE

A. Submit satisfactory evidence that there is a fully equipped, local service organization within Seventy-Five (75) miles of the project that is capable of rendering adequate inspection and service to equipment within three (3) hours after notification including standard part replacement. This organization shall be an authorized dealer for the equipment furnished on this project and prepared to offer service contract for maintenance of equipment after guarantee period.

1.09 OPERATION AND MAINTENANCE INSTRUCTIONS

- A. Give complete oral and printed instructions to operating personnel, who will verify to Architect/Engineer that they are fully aware of operation and maintenance of equipment.
- B. Furnish bound copies of "Operation and Maintenance Manual".

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- C. Include operation instructions, wiring and schematic diagrams of equipment, one-line diagram of system, complete servicing data, part numbers and voltage charts, and internal wiring diagrams of component equipment.
- D. The fire alarm system contractor or manufacturer shall offer for the owner's consideration and evaluation at the time of system submittal, a priced inspection, maintenance, testing and repair contract in full compliance with the requirements of NFPA 72H.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide a complete system by one of the following manufacturers, or an approved equivalent:
 - 1. "Siemens"
 - 2. "Tyco/Simplex Grinnell"
 - 3. "Edwards/GE Security"
 - 4. "Notifier"

2.02 FIRE ALARM CONTROL PANEL (FACP)

- A. Equal to: "Tyco/Simplex Grinnell" #4008-9121.
- B. Control unit shall be semi-recessed in the wall, modular design, dead front construction using solid state electronic components. Alarm initiating shall meet all requirements of NFPA 72A for limited energy applications and function with up to 1500 ohms resistance through alarm initiating devices, contacts and associated wiring. Control panel with annunciator shall be recessed, <u>flush</u> with the finished wall. Enclosing cabinet shall be red in color.
- C. Auto Dialer shall be digital type, dual-telephone line capability, capable of monitoring and reporting up to eight supervised circuits. Unit shall include battery, transformers, enclosure, etc., for a complete functional unit.
- D. Include LCD annunciated circuit-specific character custom labels with LED indicator points visible in front face of cabinet.
- E. Control panel shall contain internal trouble signals with silencing switches, system reset switch, system test switch and shall be supervised so that trouble signal shall indicate in event of loss of either operating or standby power.
- F. Annunciators shall be provided in face of control unit and shall indicate when both operating and standby power circuits are energized.
- G. Trouble signal silencing switches shall be provided one each zone with associated pilot lights so that faults initiating and alarm circuits can indicate trouble and be silenced independently. Trouble signals shall automatically restore to normal condition. Separate pilot lights shall be provided for each signal circuit. Relays used for sounding alarm and trouble signals shall have coils electrically supervised and sound trouble signal in event of open coil.
- H. Alarm Verification:

System shall include alarm verification for all smoke detectors, that is after a 30 second delay the system automatically resets itself and only sounds an alarm if the same detector initiates an alarm with 60 seconds. This feature shall have no effect on other initiating devices including other smoke detectors.

- I. Control panel shall be furnished with minimum point capacity of 200 initiating devices. Initiating devices shall be any combination of smokes, pull stations, heat detectors, duct detectors, control modules or monitor modules.
- J. Maintenance Alert:

Control panel shall continuously monitor the sensitivity of each smoke and heat detector and be capable of reporting maintenance conditions when dirty, dusty, faulty or in need of attention. Control panel shall make notification via remote dialer.

- K. All pilot and indicating lamps shall be light-emitting diodes (LED) or (LCD) for long life.
- L. Control panel shall be fully addressable.

2.03 FIRE ALARM ANNUNCIATOR PANEL (FAAP)

- A. Equal to: "Tyco/Simplex Grinnell" #4603-9111.
- B. Annunciator shall be remote from the control panel in location as directed by the Architect. Annunciators shall be LCD remote annunciator with the same control functions as the main control panel operator interface. Trim shall be either stainless steel or aluminum, brushed, clear finish.
- C. All pilot and indicating lamps shall be light-emitting diodes (LED) or (LCD) for long life.
- D. Zone alarm signal shall be illuminated whenever associated alarm initiating device is activated and zone trouble signal shall be illuminated whenever associated zone circuit is open or shorted out.
- E. Test switch test all circuit components including lamps.
- F. Reset Switch:

Shall be necessary to restore alarm initiating device to normal and manually activate system reset switch to extinguish annunciator alarm signal.

- G. Silencing of a trouble signal when fault occurs on any alarm zones shall not prevent resounding of trouble signal in event of subsequent fault condition of other zones, alarm signal circuits, or loss of either source of power.
- H. Wiring Supervision:

All field wiring connected to alarm initiating devices shall be electrically supervised and single opening or ground shall not cause illumination of any alarm signal.

2.04 STANDBY BATTERY AND CHARGER

- A. Standby battery and charger shall be incorporated in Control Panel and shall be furnished to sound alarms in the event of loss of normal power. Batteries shall have sufficient capacity to sound alarms for five (5) minutes after 24 hour power interruption.
- B. Charger shall use solid-state circuitry and shall be capable of recharging battery fully within 12 hours. Under normal charging, charger shall charge battery at high rate and automatically switch to low maintenance rate charge when battery is fully charged. Charger shall contain both voltmeter and ammeter of 5% accuracy.
- C. Pilot light shall be provided and remain on to indicate 120 volt AC power source. In event of loss of 120 volt AC power, a trouble signal shall sound. An amber signal indicator shall be used to show that trouble signal has been silenced.

D. Battery charger circuit shall be current limited to prevent damage in event of a short circuit on battery leads.

2.05 MANUAL ALARM STATIONS

- A. Equal to: "Tyco/Simplex Grinnell" #4099-9001.
- B. Manual Alarm Boxes shall be single acting, non-coded, semi-flush mounted, break rod feature, mechanically latched when actuated, and key reset to normal position. Rod shall not be required to maintain normal position. Construction shall be molded modern design, red finish, with instructions in raised white letters.
- C. Provide twenty-five (25) spare glass rods at control panel location.

2.06 VISUAL ALARM DEVICES

- A. Equal to:
 - 1. "Tyco/Simplex Grinnell" True Alert #4906-9204 (Ceiling Type)
 - 2. "Tyco/Simplex Grinnell" True Alert #4906-9201 (Wall Type)
- B. Description:
 - 1. Shall be furnished per the drawings.
 - 2. Multi-candela strobe.
 - 3. Ceiling-mounted or wall-mounted unit as and where indicated.
 - 4. Housing color White, "Fire" lettering Red (Ceiling Type). Housing color Red, "Fire" lettering White (Wall Type).
 - 5. Provide candela ratings in compliance with the Code, ADAAG and NFPA 72, 2002.
 - 6. Xenon strobe with a minimum repetition rate of 1 HZ, not exceeding 3 HZ and a maximum duty cycle of 40% with a pulse duration of .2 seconds.
 - 7. Unfiltered or clear filtered white light.
 - 8. Devices shall be synchronized in each line of sight per ADA.
- C. Installation and Requirements:
 - 1. Devices shall be mounted at a height of 80 inches above the highest level of the finish floor or 6 inches below the ceiling, whichever is lower.
 - 2. Devices shall be located no further than 15'-0" from the end of any corridor.
 - 3. Installation heights and locations shall comply with the ADA.

2.07 AUDIBLE/VISIBLE ALARM DEVICES

- A. Equal to:
 - 1. "Tyco/Simplex Grinnell" True Alert #4906-9230 (Ceiling Type)
 - 2. "Tyco/Simplex Grinnell" True Alert #4906-9227 (Wall Type)
- B. Description:
 - 1. Shall be furnished per the drawings.
 - 2. Horn with multi-candela strobe.
 - 3. Ceiling-mounted or wall-mounted unit as and where indicated.
 - 4. Housing color White, "Fire" lettering Red (Ceiling Type). Housing color Red, "Fire" lettering White (Wall Type).
 - 5. Provide candela ratings in compliance with the Code, ADAAG and NFPA 72, 2002.
 - 6. Xenon strobe with a minimum repetition rate of 1 HZ, not exceeding 3 HZ and a maximum duty cycle of 40% with a pulse duration of .2 seconds.
 - 7. Unfiltered or clear filtered white light.

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- 8. Devices shall be synchronized in each line of sight per ADA.
- 9. Provide a minimum of <u>15 db above ambient sound</u> levels.
- C. Installation and Requirements:
 - 1. Devices shall be mounted at a height of 80 inches above the highest level of the finish floor or 6 inches below the ceiling, whichever is lower.
 - 2. Devices shall be located no further than 15'-0" from the end of any corridor.
 - 3. Installation heights and locations shall comply with the ADA.

2.08 SMOKE DETECTORS

- A. Smoke detectors shall be photo-electric type completely solid state with light emitting diode and shall not use any ware filament vacuum tubes.
- B. Duct type smoke detectors shall be provided in all air handling units above 2,000 CFM in the return side and both on the return and supply side in units above 15,000 CFM. Duct type detectors shall be provided with remote indicating pilot lights and test switches, mounted 4'-0" above the floor. Verify exact location with Architect/Engineer.
- C. Ceiling type smoke detectors shall be combination heat and smoke sensing type, provided with indicating pilot light and test switches.
- D. Smoke Detectors which operate electromagnetic door holders, air handling units, roll-down screens, etc. shall be provided with two sets of contacts. One set shall release the door or screen, shut down the air handling unit; the other set shall sound a general fire alarm.
- E. Provide one smoke detector on each side of every door held by electromagnetic door holders, wherever holders are indicated. Provide smoke detectors whether or not they are indicated on the Drawings.
- F. Provide one smoke detector on each side of every smoke damper, wherever smoke dampers are indicated. Provide smoke detectors whether or not they are indicated on the Drawings.
- G. Smoke detectors indicated with audible base shall have capability of two distinct alarm conditions. Upon activation of the smoke detector chamber a supervisory signal shall be annunciated at the fire alarm panel. Upon thermistor and smoke detector activation a general alarm condition shall be sounded.
- H. Smoke detector audible bases shall contain a mini horn capable of 85 dB at 10 feet.

2.09 HEAT DETECTORS

- A. Heat detectors shall be ceiling mounted employing two independent methods of detection.
- B. All units shall be combination units detecting a fixed temperature rating of 135 degrees F (57 degrees C) and a rate-of-rise of 15 degrees F (8.3 degrees C) per minute spaced a maximum of 50 ft. on center.
- C. Fixed temperature units shall detect a fixed temperature rating of 190 degrees F (88 degrees C) spaced a maximum of 15 ft on center. Install in mechanical rooms, kitchens and cooking spaces.

2.10 ELECTROMAGNETIC DOOR HOLDERS

- A. Equal to:
 - 1. "Tyco/Simplex Grinnell" #2088-9609, Wall-Mounted.
 - 2. "Tyco/Simplex Grinnell" #2088-9610, Floor-Mounted, Single Door.
 - 3. "Tyco/Simplex Grinnell" #2088-9611, Floor-Mounted, Double Door.

- B. Description:
 - 1. Shall be furnished for door(s) as indicated on the drawings.
 - 2. Provide type as indicated on the drawings. Where not indicated, provide wall-mounted units. If specific condition does not permit wall-mounted units, consult Architect for ability to use floor-mounted units.
 - 3. Wall-Mounted units shall be surface mount and shall include semi-flush magnet, cover assembly, catch plate, matching electrical box housing, and surface-mount box.
 - 4. Floor-Mounted units shall include magnet(s), catch plate(s), housing, mounting plate, gasket, and mounting hardware.
 - 5. Provide back plate on opposite side of hollow doors, for reinforcing catch plate.
 - 6. Provide chrome catch plate extender rod as required for length and reach needed.
- C. Provide wall and floor mounted magnetic door holders for single or double doors as indicated on the drawings. Coordinate the type and location with the door manufacturer's shop drawings and field installer.
- D. Door holders shall be constructed of brushed stainless steel with a long-life electromagnet designed to release the doors when smoke or heat is detected by a local detector. Door closer will be provided in another section of these specifications. Doors may be manually opened and closed at any time.
- E. Door holders shall be powered from the control panel.

2.11 PROTECTIVE GUARDS AND COVERS

- A. Shall be clear, tamperproof, UV stabilized polycarbonate shield and frame specially designed to custom fit the specific fire alarm devices they protect. Shields to be slotted for all types of audible devices.
- B. If allowed by the Architect, chrome plated heavy wire guards may be used in lieu of polycarbonate shields.
- C. In areas where to be installed, install on all manual alarm stations, alarm signals, smoke detectors, heat detectors, etc.
- D. Areas of installation to include all spaces prone to impact on a regular basis such as gymnasiums, mechanical rooms, custodial rooms, storage rooms and similar spaces.

PART 3 - EXECUTION

3.01 DESIGN AND INSTALLATION DRAWINGS

- A. Show a general layout of the complete system including equipment arrangement. It shall be the responsibility of the fire alarm contractor to verity dimensions and assure compatibility all other systems interfacing with the fire alarm system.
 - 1. Identify on the drawings, conduit and conductor sizes and types with number of conductors in each conduit. Provide each conduit and device with a unique identification for addressable alarm initiation devices, the system identifier shall be the system address for that device.
 - 2. Indicate on the point to point wiring diagrams, interconnecting wiring within the panel between modules and connecting wiring to the field device terminals.

3.02 DEMOLITION

- A. Contractor shall remove all the existing system components. All components, devices and wiring installed shall be new.
- B. Contractor shall coordinate the work so that the Fire Alarm System, either new or existing, is in full operation while building is occupied by the public.

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- C. Should it become necessary to make the existing Fire Alarm Systems inoperative, ample notification shall be given to the Owner, and the Architect/Engineer. Architect/Engineer will issue additional written instructions that are to be provided at this Contractor's expense.
- D. All existing fire alarm equipment shall remain the properly of the Owner and shall be stored off-site by the Contractor at a central location where directed by the Owner.

3.03 <u>WIRING</u>

A. Fire alarm system wiring shall be installed with open plenum fire coded cable. Install wire neatly with bridal rings along walls. Maximum spacing 5'-0". Wire shall be of the size and type as recommended by system manufacturer but not smaller than #14 AWG. Wire shall be color coded throughout and tagged at each box and in the equipment cabinet for identification.

3.04 IDENTIFICATION

A. Fire alarm wiring in equipment cabinets shall be terminated on marked terminal strips. Tag wiring at both ends to correspond with wiring diagram. Arrange wire neatly in cabinets and lace with nylon cable straps. Cable terminations shall be arranged so that sections of the system may be isolated for servicing.

3.05 END OF LINE RESISTORS

A. End of Line Resistors shall be in separate outlet box in mechanical, electrical or storage space or above the corridor ceiling. Mark and locate on system drawings.

3.06 CONNECTIONS

In addition to the alarm devices specified here, other connections to the fire alarm system shall include but not limited to, the following:

- A. From the fire alarm control panel, provide a connection to each manual alarm station, to each audio and visual alarm device and to each automatic detection device.
- B. From the fire alarm control panel, provide connection to each fan motor controller.
- C. From the fire alarm control panel, provide a connection to each kitchen hood system.
- D. From the fire alarm control panel, provide a connection to the automatic dialer to the telephone terminal board.
- E. From the fire alarm control panel, provide a connection to each electromagnetic door holder and access control power supplies and connection equipment.
- F. From the fire alarm control panel, provide connection to each automatic fire sprinkler system device; Including but not limited to: riser flow, riser tamper, PIV, pit valves, zone valves, etc.

3.07 INSTALLATION

- A. Perform work in accordance with the requirements of NEC, NFPA 70 and NFPA 72.
- B. New devices can be surface mounted on existing walls.

3.08 CERTIFICATE OF COMPLIANCE

A. Complete and submit to the Project Architect in accordance with NFPA 72, paragraph 2.2.2.

3.09 CLEANING

A. Vacuum clean inside of all boxes, cabinets and equipment when work is complete.

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SUBMITTAL CHECKLIST

- 1. Manufacturer's catalog data cut sheets.
- 2. Complete full size installation drawings.
- 3. Power calculations.

SECTION 13930 - WET PIPE FIRE SUPPRESSION SPRINKLERS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. The work included under this Section of the Specifications consists of the furnishing of all materials and equipment, obtaining and paying for all permits required, and the performing of the labor and services required for complete and operating automatic fire sprinkler system. This includes design, layout, shop drawings, approvals, all items of material and labor, and all other costs to complete the installation.
- B. Types of work in this section include (but are not limited to) the following:
 - 1. Sprinkler O.S. and Y. Gates.
 - 2. Overhead mains and risers.
 - 3. Branch lines and sprinkler heads.
 - 4. Drains, inspector's tests and flushing connections.
 - 5. Gauges.
 - 6. Shop drawings and operating instructions.
 - 7. Pipe sleeves, hangers, supports, etc.
 - Waterflow and valve supervisory devices. (Waterflow switch, pressure switch and O.S. and Y. position indicator switches).
 - 9. Fire service water connections to city water main.
 - 10. Fire department connections.
 - 11. Exterior fire service lines.
 - 12. Service vaults and valve pits.
 - 13. Stage standpipe and hose connections.
 - 14. Stair standpipe and hose connections.
 - 15. Dry system requirements for combined systems, wet and dry zones from same riser headers.
 - 16. Emergency Access Knox-Box.
- C. Prepare all drawings, calculations, and applications required to obtain approval of the system by all state and local authorities having jurisdiction.
- D. See Fire Protection Drawings, Site Utility Plans, Plumbing and Electrical, for additional requirements.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 09900 - Painting Section 15050 - Basic Mechanical Requirements Section 15420 - Plumbing Piping Outside Building Division 16 - Electrical

1.03 QUALITY ASSURANCE

- A. Licensed fire protection contractor with current certification to perform work in the state, county and city where work is located.
- B. Install work in accordance with the regulatory requirements of the following:
 - 1. State Building Code, current edition.
 - 2. NFPA 13.
 - 3. UL Listed, Underwriter's Laboratory.
 - 4. FM Approved, Factory Mutual, pamphlet 20 rules for installing sprinklers.
 - 5. State Safety Code for Elevators and Escalators.
 - 6. State Fire Marshal.
 - 7. City/County Fire Marshal.

8. State insurance service offices.

1.04 <u>SUBMITTALS</u>

- A. Submissions for Approval:
 - 1. Submit required shop drawings and hydraulic calculations to State Fire Protection Bureau, local Fire Marshal, and local Fire Chief for review and approval.
 - 2. Submit evidence of meetings with local Fire Marshal and local Fire Chief, as part of the submittals package to the Architect.
 - 3. Once approvals of these plans is obtained from the above-mentioned authorities, submit six (6) copies of complete submittals to the Architect.
 - 4. Contractor to make all submittals for permits and approvals and as required per all State regulations and requirements.
- B. Shop Drawings:
 - 1. Must be legible prints of clear sharp tracings, prepared at scale equal to that of the plans in the Drawings and must be shown along with piping, sprinklers, etc.
 - 2. Indicate each area of installation as to zone included within and riser served from.
 - 3. Indicate construction and installation of each area including ceiling and roof heights.
 - 4. Prepare using a reference all of the architectural, structural, mechanical, plumbing and electrical drawings. Match room names, numbers, and general project nomenclature.
 - 5. Submit reflected ceiling plans to Architect for final approval prior to fabrication. Contractor shall exercise special attention to coordinate head location layouts in ceilings.
 - 6. Architect will make available, at no cost, base xref drawings in Autocad format for fire protection contractor's use in preparing shop drawings.
 - 7. Architect to review layout for purposes of aesthetics and design intent, not for coverage or capacity of the sprinkler system or system design.
- C. Product Literature:
 - 1. Manufacturer's cutsheets and product literature for all materials included in the system.
- D. Calculations:
 - 1. Designs and calculations must be certified by a registered design professional licensed to design systems in the State of installation.
 - 2. Design per hazard classifications as indicated on the Drawings.
 - 3. Indicate on plans areas and hazard classifications of submitted calculations for reference.
- E. At the completion of the work provide a small scale plan of the building, indicating the locations of all control valves, low point drains, and inspectors test. The plans shall be neatly drawn.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Arrange deliveries in quantities to permit continuity of installation.
- B. Store materials off ground and under cover to prevent rusting, denting and other damage and deterioration prior to installation.

1.06 PROJECT DESIGN REQUIREMENTS

- A. Design system for the occupancies and hazards as listed on the drawings.
- B. Design the complete system according to the criteria outlined on the plans and specifications.
- C. Contractor is responsible for meeting with local Fire Marshal and local Fire Chief to insure the system meets all local requirements and they are all incorporated into the system design.

- D. Contractor is responsible for meeting with local water utility to insure the system meets all requirements for the local utility coordination, connections, and equipment. Coordinate approval and acceptance of equipment service items with utility.
- E. No additional compensation will be considered for local official or utility requirements that may not have been indicated on the plan.
- F. Contractor is responsible for conducting a flow test for use in determination of sprinkler system design requirements. Coordinate with local utility and/or fire department.

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. Sprinkler Heads:
 - 1. Recessed Pendent Sprinklers in Ceilings:
 - a. Rated for Hazard Classifications as indicated on the Drawings.
 - b. Quick Response, Standard or Extended coverage.
 - c. White polyester coated head and escutcheon.
 - d. Surface pendents or extended escutcheons types are not acceptable.
 - 2. Upright Pendent Sprinklers at Exposed Structure:
 - a. Rated for Hazard Classifications as indicated on the Drawings.
 - b. Quick Response, Standard or Extended coverage.
 - c. Brass head.
 - d. Provide wire guards in gymnasiums, mechanical rooms, industrial areas, and like conditions.
 - 3. Sidewall Sprinklers:
 - a. Rated for Hazard Classifications as indicated on the Drawings.
 - b. Quick Response, Standard or Extended coverage.
 - c. White polyester coated head and escutcheon.
 - 4. Dry Pendent Sprinklers in Coolers/Freezers:
 - a. Rated for Hazard Classifications as indicated on the Drawings.
 - b. Quick Response, Standard or Extended coverage.
 - c. Chrome head and escutcheon.
 - 5. Dry Pendent Sprinklers in Other Locations:
 - a. Rated for Hazard Classifications as indicated on the Drawings.
 - b. Quick Response, Standard or Extended coverage.
 - c. Head and escutcheon to match others in exposed areas.
 - d. Brass head where not exposed to view.
- B. Pipe:
 - 1. Black Steel:
 - a. Schedule 40 (1" 2").
 - b. Schedule 10 (2-1/2" 8").
 - c. 300 psi maximum working pressure rating.
 - d. ASTM A-135.
 - 2. Meet NFPA tests and requirements for:
 - a. Welded Outlets.
 - b. Hydrostatic Pressure.
 - c. Side Wall Rupture.
 - d. Vibration Test.

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- C. Fittings:
 - 1. Cast Iron, Threaded:
 - a. Class 125 (standard).
 - b. ANSI B16.14.
 - 2. Cast Iron, Flanged:
 - a. Class 250 (extra heavy).
 - b. ASME B16.1.
 - c. Flanged bolts shall be hexagon head machine bolts with heavy semi-finished hexagon head nuts, cadmium plated, ANSI B18.2.
 - 3. Malleable Iron:
 - a. Class 150 and Class 300.
 - 4. Rigid Couplings and Fittings:
 - a, Ductile Iron.
 - b. ASTM A-536.
 - c. Gasket material shall be Grade "A" EPDM.
- D. Flexible Sprinkler Head Drops:
 - 1. Basis of specification: "Easy Flex USA", EasyFlex Sprinkler Drops.
 - 2. Used in lieu of hard-piped head drops to lay-in grid ceiling systems.
 - 3. Corrugated stainless steel flexline pipe tubing, braided or unbraided.
 - 4. Manufacturer's standard T-bar and T-bar brackets as required and as appropriate to the ceiling grid system being installed into.
 - 5. Manufacturer's standard snap clamps to secure the sprinkler head to the T-bar.
 - 6. Provide all nipples, nuts, reducers, isolation rings, gaskets, clamps, brackets, bar, etc. required for a complete installation.
 - 7. Take care to not crimp bends or pinch lines of installation to obstruct flow.
- E. Pipe Hangers:
 - 1. Carbon steel with plated finish.
 - 2. Adjustable swivel ring.
 - 3. Suitable for structural system without use of expansion bolts.
 - 4. Provide all threaded rods as required, material and finish to match hangers.
 - 5. Provide steel beam clamps as required, material and finish to match hangers.
- F. Riser Valves, Check Valves, and Butterfly Valves:
 - 1. Ductile Iron.
 - 2. Vertical or horizontal configuration and orientation as most appropriate for area and layout of install.
- G. Double Check Assemblies:
 - 1. Designed to prevent backflow of pollutants, that are objectionable but not toxic, from entering the potable water supply system.
 - 2. Designed to be under continuous service pressure while possibly subjected to simultaneous backflow pressure or back siphonage.
 - 3. Consist of two independent check modules within a single housing nd two drip tight shut-off valves.
 - 4. Contains integral by-pass meter to monitor water flow in gallons per minute.
- H. Post-Indicator Valves:
 - 1. Field adjust for install to height per NFPA requirements.
 - 2. Set the "Open" and "Shut" targets for the appropriate valve size.
 - 3. Standpipe above ground and head top section to be painted red.

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- I. Fire Department Connections:
 - 1. Install in freestanding post configuration on site, atop service vault or a through-wall configuration directly on building as indicated on the Drawings and as required by state and local authorities.
 - 2. Designed for connection of fire department hoses to supplement water supply.
 - 3. Field adjust for install to height per NFPA requirements.
 - 4. Designed to provide minimum 250 gpm flow per each 2-1/2" inlet.
 - 5. Cast brass, two way inlet body with drop clappers.
 - 6. Polished brass plate with lettering "Fire Department Connection".
 - 7. Two polished brass double female snoots, plugs and chains.
 - 8. Threads as approved by local Fire Marshal or Fire Chief. Contractor to field verify.
 - 9. 1/2" automatic ball drip between check valve and fire department connection.
- J. Drains:
 - 1. 2" drain risers.
 - 2. Main drain line at riser to exterior of building.
 - 3. Pipe to suitable hub or floor drains inside building.
 - 4. Auxiliary drains at low points and where otherwise necessary.
 - 5. Coordinate location and routing of drain lines with Architect.
- K. Signs:
 - 1. Standard metal signs.
 - 2. Meet all requirements of NFPA 13.
- L. Alarms:
 - 1. Bells:
 - a. Rated for indoor or outdoor use.
 - b. Red powder coated finish.
 - c. Provide weather-proof backbox for all outdoor installations.
 - d. Provide electrical to bells as required for proper operation.
 - 2. Flow Switches:
 - a. Provide downstream of the butterfly valve for each riser zone.
 - b. Approved for use on steel pipe.
 - c. Actuated when a flow of 10 gpm minimum occurs downstream of device.
 - d. Contains an adjustable, instantly recycling pneumatic retard. Select and set retard period.
 - e. Provide electrical to switches as required for proper operation.
 - 3. Tamper/Supervisory Switches:
 - a. Provide at butterfly valve for each riser zone.
 - b. Provide at post indicator valve for system.
 - c. Weatherproof and tamperproof switch to monitor open valve positions.
 - d. Mechanically activated by cover removal or moving the integral trip rod.
 - e. Provide electrical to switches as required for proper operation.
- M. Spare-Head Cabinet:
 - 1. Metal cabinet with lock and continuous piano hinge door.
 - 2. Provide two (2) of each type head installed on project.
 - 3. Required tools for replacement.
 - 4. Mount at riser location.
- N. Service Vault:
 - 1. Provide as indicated on the Drawings and as required by state and local authorities.
 - 2. Submersible Sump Pump:
 - a. Provide equal to: "Liberty Pumps", Model 231.

- b. Quick disconnect type with wide angle float.
- c. 1/3 hp, 1-1/2" discharge, 120 volt, 3450 rpm.
- 3. If detail is not indicated on drawings, provide vault with the following minimum requirements:
 - a. Precast concrete vault, size as required by code, sprinkler contractor and local officials. Provide manhole cover on top face for access into vault.
 - b. Double Check with Bypass Meter, on supports.
 - c. Central OS&Y gate valve ahead of Double Check, with Post Indicator Valve (PIV) atop vault.
 - d. Central OS&Y gate valve as an inline maintenance check valve downstream of Double Check
 - e. Fire Department Connection atop vault downstream from the inline maintenance check valve.
 - f. Submersible sump pump on GFI duplex outlet within vault at top near manhole cover. Provide plug and cord power connection to sump pump.
 - g. Provide bituminous damproofing on all surfaces of vault below grade, sides and bottom.
 - h. Provide thru sealant mastic or tape at all seams between vault panels.
 - i. Grout and seal all penetrations thru vault.
- O. Stage Standpipe and Hose Connections:
 - 1. Provide as indicated on the Drawings and as required by NFPA and state and local authorities.
 - 2. Whether indicated or not, provide the following minimum standpipe requirements:
 - a. Provide a wet standpipe system with both 1-1/2" and 2-1/2" hose connections.
 - b. Class of standpipe to be as required by Code and NFPA.
 - c. Provide at each side of the stage.
 - d. All hose connections, threads, and fittings shall be approved by local jurisdiction and match hoses of the local fire department.
 - 3. Whether indicated or not, provide the following minimum hose and cabinet requirements:
 - a. The 1-1/2" hose connections shall be equipped with sufficient lengths of 1-1/2" hose to provide fire protection for the entire stage area.
 - b. Hose connections shall be equipped with an approved adjustable fog nozzle.
 - c. Mount hose connections and hose in a cabinet or rack as required by Code and NFPA.
 - d. All hose connections, threads, and fittings shall be approved by local jurisdiction and match hoses of the local fire department.
 - 4. If allowed by Code and NFPA, make the following exceptions to standpipe requirements:
 - a. Delete the requirements to provide the standpipe and connections as listed above.
 - b. Provide a 1-1/2" hose connection connected to the fire sprinkler system.
 - c. Provide proper cap and chain for the hose connection valve assembly.
 - d. Provide at each side of the stage.
 - e. All hose connections, threads, and fittings shall be approved by local jurisdiction and match hoses of the local fire department.
 - 5. If allowed by Code and NFPA, make the following exceptions to hose and cabinet requirements:
 - a. Delete the requirements to provide the hose and fog nozzle as listed above.
 - b. Delete the requirements to provide the rack or cabinet as listed above.
 - c. Provide proper cap and chain for the hose connection valve assembly.
 - d. All hose connections, threads, and fittings shall be approved by local jurisdiction and match hoses of the local fire department.
- P. Stair Standpipe and Hose Connections:
 - 1. Provide as indicated on the Drawings and as required by NFPA and state and local authorities.
 - 2. Whether indicated or not, provide the following minimum standpipe requirements:
 - a. Provide a Class I wet standpipe system with 2-1/2" hose connections.
 - b. All hose connections, threads, and fittings shall be approved by local jurisdiction and match hoses of the local fire department.
 - 3. Locate hose connection at intermediate landing between floor levels.
 - If multiple landings exist, locate on landing most closely located midway between floor levels.

- Q. Dry System:
 - 1. Basic Requirements:
 - a. Include all components as required to meet all requirements for a combined system per NFPA 13, Chapter 7.
 - b. Proper items and components as required to separate piping at riser to create a dry system header for a combined system distribution throughout.
 - c. Includes, but is not limited to, dry pipe valves, check valves, bypass valves, indicating valves, relief valves, pressure gauges, drains, tripping device, exhauster, air compression, piping, heads and connections.
 - d. Dry system riser to begin at dry pipe valve and make proper connection to the wet system riser piping and components.
 - e. Provide a listed quick-opening device and all associated components, unless specifically not required.
 - f. Provide a listed anti-flooding device and all associated components, unless specifically not required, installed in the connection between the dry pipe sprinkler riser and the quick-opening device.
 - 2. Air Pressure:
 - a. If not available from any other source within the project, provide an air compressor specifically for the system, with all piping, connections and components as required.
 - b. Maintain the required air pressure on the system at all times, with a permanent connection to the dry pipe system from an air compressor.
 - c. Provide 1/2" minimum pipe connection from the air compressor to the dry system riser and enter the system above the priming water level of the dry pipe valve.
 - d. Install a check valve in the air line. Include a shut-off valve on the supply side of this check valve and shall remain closed unless filling the system.
 - e. Provide a relief valve between the air compressor and the controlling valve to be set to relieve the system as required.
 - f. Where an air line is taken from a larger system serving other uses, provide a regulator as required to maintain proper pressure on the dry pipe system. Provide a relief valve to be set to relieve the system as required. Provide backflow prevention device as required for coordination of line with other use lines.
- R. Emergency Access Knox-Box:
 - 1. Provide as indicated on the Drawings and as required by NFPA and state and local authorities. If not otherwise indicated, provide a single recessed mount cabinet located as required by local authorities and as coordinated with the Architect.
 - A surface mount unit may be used only as specifically permitted by the Architect.
 - 2. Recessed Mount Cabinet:
 - a. "Knox Company"; Knox-Box 3200 Series.
 - b. 4"H x 5"W x 3"D, 1/4" thick plate steel housing, fully welded.
 - c. 1/2" thick plate steel door with interior gasket seal and stainless steel hinge.
 - d. Double-action rotating tumblers and hardened steel pins accessed by a biased cut key. Lock to have a 1/8" thick stainless steel dust cover with tamper seal mounting capability.
 - e. UL Listed box and lock.
 - f. Recessed mounting with galvanized or stainless steel thru-bolts through wall per manufacturer's recommendations. Recessed Mounting Kit with 6-1/2"H x 6-1/2"W x 5"D shell backbox.
 - g. 7"H x 7"W face flange.
 - h. Color: Aluminum.
 - 3. Surface Mount Cabinet:
 - a. "Knox Company"; Knox-Box 3200 Series.
 - b. 4"H x 5"W x 3-3/4"D, 1/4" thick plate steel housing, fully welded.

- c. 1/2" thick plate steel door with interior gasket seal and stainless steel hinge.
- d. Double-action rotating tumblers and hardened steel pins accessed by a biased cut key. Lock to have a 1/8" thick stainless steel dust cover with tamper seal mounting capability.
- e. UL Listed box and lock.
- f. Surface mounting with galvanized or stainless steel thru-bolts through wall per manufacturer's recommendations.
- g. Color: Aluminum.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install complete per IBC Section 903 and NFPA 13.
- B. Furnish and install wet pipe automatic sprinklers system of first quality in every and all respects, together with the necessary pipe, fittings, hangers, and other apparatus necessary for a complete and finished installation, in conformance with present standards of NFPA and all state and local authorities.
- C. All sprinkler piping must be substantially supported from building structure and only approved type hangers used. Sprinkler lines under ducts shall not be supported from ductwork, but shall be supported from building structure with trapeze hangers where necessary.
- D. Coordinate work with work of other trades to avoid conflicts and interference and allow proper execution of all work. Do not damage or displace work of other trades.
- E. Contractor shall make no changes in installation from layout as shown on approved shop drawings unless such change is specifically approved by the Architect. Any changes made other than as above stated, are at the Contractor's own expense and responsibility.
- F. Provide flushing connections in cross mains as specified in the latest NFPA Standards, Pamphlet No. 13.
- G. Sprinkler heads shall be centered in all suspended acoustical ceiling panels.
- H. Replace acoustic ceiling panels damaged due to installation of sprinkler heads.
- I. Inspector's test connection, consisting of 1" piping, 1" globe valve, and 1/2" special discharge nozzle, shall be installed and connected to the systems at points as required by NFPA and all authorities having jurisdiction.
- J. Connect the sprinkler system to the fire alarm system per NFPA requirements. Sprinkler system shall be electronically supervised per IBC 903.4 and NFPA.

3.02 PHASING

- A. Charge system so as to place in service all areas of the fire sprinkler system required to provide protection to all areas and spaces as construction is completed and prior to Owner occupancy.
- B. Installation of system shall allow for expansion and phasing of project.
- C. Coordinate zoning of installation of system as required to avoid use of any shut-off valves within the system, other than at the main riser, to minimize the number of monitoring points in the system.
- D. It may be necessary, due to phasing, sequencing of construction, to avoid additional shut-off valves,

requirements of the Fire Marshall, or any other reason, to drain and recharge the system after initial charging. This may need to be done multiple times during the construction process. This work shall be figured into the bid and accomplished by the Contractor at no additional costs.

3.03 ADJUSTING, TESTING AND CLEANING

- A. All sprinkler piping shall be tested for a period of two hours at a hydrostatic pressure of 200 lbs. and all piping, valves, heads, etc., shall be watertight.
- B. All piping shall be thoroughly flushed in accordance with the requirements of the latest NFPA Standards, Pamphlet No. 13, and flush test must be witnessed by proper authority.
- C. Architect's representative shall be notified in advance regarding time and date of all tests.
- D. During the installation and testing period of the sprinkler system, the Contractor shall be responsible for any damage to the work of others, to the building, its contents, etc., caused by leaks in any equipment by unplugged or disconnected pipes, fittings, etc., or by overflow and shall pay for necessary replacements or repairs to work by others, building, fixtures or merchandise damaged by such leakage.
- E. Clean all exposed piping, fittings, heads and other accessories. Polish all sprinkler heads in finished areas.
- F. Repair or replace damaged or marred items.
- G. Remove debris from work area.

SUBMITTAL CHECK LIST

- 1. Submissions for Approval.
- 2. Approvals from State Fire Protection Bureau, Local Fire Marshal, and local Fire Chief.
- 3. Shop Drawings.
- 4. Product Literature.
- 5. Calculations.

SECTION 14241 – MACHINE-ROOM LESS HYDRAULIC PASSENGER ELEVATORS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Machine-Room Less Hydraulic passenger elevator as shown on the Drawings and specified herein.

1.02 RELATED WORK

 A. Specified elsewhere: Section 03300 - Cast-In-Place Concrete Section 04220 - Concrete Unit Masonry Section 05500 - Metal Fabrications Section 07130 - Self-Adhering Sheet Waterproofing Membrane Division 16 - Electrical.

1.03 QUALITY ASSURANCE

- A. Comply with all laws, rules and regulations of governmental authorities having jurisdiction over this part of the Work.
- B. Comply with applicable provision of ANSI/ASME A17.7, Safety Code for Elevators and Escalators; Including requirements for Elevators, Escalators, Dumbwaiters, Moving Walks and Material Lifts.
- C. Elevator shall be in full compliance with State and Local accessibility requirements for the handicapped and shall conform with ICC/ANSI A117.1, American National Standard on Accessible and Usable Buildings and Facilities.
- D. In the event of conflict between code requirements, the more stringent shall apply.
- E. The basic lift equipment shall be as manufactured by a firm that also installs and maintains such equipment.
- F. Before starting work, the manufacturer shall furnish evidence to the Owner that he has furnished and installed equipment of the same general type as specified and that such equipment has been in successful operation for at least 5 years.
- G. In all cases where equipment, or part of equipment, is referred to as singular in number, it is intended that such reference shall apply to as many such units, or parts, as are required to complete the installation.
- H. Requirements of the Regulatory Agencies:
 - a. Fabricate and install Work in compliance with all applicable jurisdictional authorities.
 - b. File shop drawings and submissions to local authorities as the information is made available. Company pre-inspection and jurisdictional authority inspections and permits are to be made on a timely basis as required. Work will include all inspection and re-inspections that are required to ensure licenses are issued.
- I. Subcontractor Qualifications:
 - a. Execute work of this specification only by a contractor/company who has adequate product and public liability insurance in excess of one million dollars.
 - b. Skilled tradesmen must be employees of the contractor to perform the work on a timely basis. Employees must be trained by the manufacturer and be supervised by the elevator contractor.

J. Substitutions:

No substitutions will be considered unless written request for approval has been submitted by the bidder and received by the architect at least 10 days before the date of receipt of bids. Each such request shall include a complete description of the proposed substitute including drawings, test data, photographs and any other information needed for consideration.

1.04 <u>SUBMITTALS</u>

- A. Submit the following:
 - 1. Manufacturer's Literature: Material and equipment descriptions, load data, parts lists, wiring diagrams and installation instructions.
 - 2. Shop Drawings: Show complete layout of lift, car enclosure, hoistway entrances, machinery, piping, electrical, etc.
 - 3. Certificates: Furnish evidence of certification of required fire endurance rating, furnish certification of UL label listing, or that of other acceptable testing agency.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original unopened protective packaging. Store materials in original protective packaging. Prevent soiling, physical damage or wetting. Protect equipment and exposed finished during transportation and erection against damage and stains.

1.06 TEMPORARY USE

A. Elevators shall not be used for construction purposes or during construction period without written approval from the Architect.

1.07 MAINTENANCE AND SERVICE

- A. Provide maintenance service for twelve (12) months following date of final acceptance of the Work. Maintenance shall include bi-weekly examination by installers, competent personnel, necessary adjustment, lubrication, cleaning and replacement of parts. Renewal or repair necessitated by misuse, negligence or other conditions beyond installer's control shall not be included as cost-free maintenance.
- B. Provide emergency service on a daily, 24 hour basis for three months following date of final acceptance.
- C. Maintenance Data:
 - 1. If a special portable computer display device or any special test equipment is required to maintain this equipment, it must be provided along with all board schematics and component listings for all printed circuit boards and electronic components.
 - 2. If the portable computer display device has a degenerative life span, a new one will be provided at the necessary intervals during warranty period at no cost to the Owner.
 - 3. All software documentation and software assembly drawings will be provided in the written form as well as cassette.
 - 4. This is for maintenance purposes only and refusal to supply this information because of patent rights or propriety information restrictions by the manufacturer will not be accepted.

1.08 PERMITS AND INSPECTIONS

A. The elevator installer shall obtain and pay for necessary Municipal or State inspections and permits, and make such tests as are called for by the regulations of such authorities. These tests shall be made in the presence of the authorized representatives of such authorities.

1.09 SPECIFIC PRODUCT WARRANTY

A. The project warranty provided by the contractor shall include agreeing to repair or replace the elevator and any components which failed to fulfill performance requirements due to defective materials or workmanship during the warranty period.

B. The warranty period for work included in this Section shall extend for (1) year from the date of Substantial Completion.

1.10 **OWNER'S INSTRUCTIONS AND MANUAL**

- After installation is completed, the contractor shall instruct the Owner in the proper use, operation and Α. maintenance requirements of the elevator. Instructions to also include emergency procedures and safety rules and precautions. Training session shall be videotaped by the Contractor for use by the Owner.
- B. The contractor shall also supply the Owner with an Owner's Manual detailing the operating, safety and maintenance procedures of the elevator.

1.11 WORK BY OTHERS

Provide the following in accordance with code requirements:

- Hoistway: Α.
 - 1. Provide a legal hoistway of the size shown, plumb within 1".
 - Adequate supports for guide rail brackets, not to exceed spacing required by Code. 2. When maximum spacing is exceeded, for some specific reason required by project conditions, rail stiffeners or additional supports shall be provided at the Contractor's expense.
 - Where floor-to-floor heights exceed 14', additional elevator entrance structural supports must be 3. provided, by others. Coordinate exact location and type of support with manufacturer.
 - Concrete block wall construction requires a solid section for anchoring rail bracket fastenings and 4. may consist of a concrete bond beam.
 - 5. Entrance walls to be constructed after door frames and sills are installed. Entire front wall at second landing to be left open until elevator equipment is installed.
 - Each landing to be suitably prepared for entrance sill installation, with grouting done after sills are 6. installed.
 - 7. Coordinate all requirements of hoistways with the manufacturer for their specific equipment and requirements for installation.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide one of the following approved products:
 - "Otis", HydroFit MRL 2500, Machine-Room Less Holeless Hydraulic, Passenger. 1.

2.02 ELEVATOR SCHEDULE

- Type: Holeless - Twin direct acting oil hydraulic cylinder without well holes. 1.
- 2. Machine Location: Machine-room less application. Tank and controller in hoistway pit. Machine-room less application. Controller in hoistway and accessible 3. Controller Location:
- in the side hoistway wall.
- Locate on 1st landing unless otherwise indicated on Drawings. 2.500 lbs.
 - 4. Rated Capacity:
- 5. Rated Speed: 6.
 - Staging: 2-Stage.
- As indicated on Drawings; number of stops. 7. Stops:
- Travel Distance: As indicated on Drawings; rise between landings and total rise. 8. 9. Openings:
 - As indicated on Drawings; right hand, left hand, or centered.
- 10. Hoistway and Pit Size: 8'-4" clear width x 5'-9" clear depth.
- 11. Car Inside Size: 6'-5 9/16" clear width x 4'-3 9/16" clear depth.

125 fpm.

MACHINE-ROOM LESS HYDRAULIC PASSENGER ELEVATORS

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12.	Car Cab Height:	7'-9" clear.
13.	Door Entrance Type:	Single slide door.
14.	Door Entrance Size:	3'-6" wide x 7'-0" high.
15.	Main Power Supply:	3 phase, 60 Hz, AC. Voltage as shown on Electrical Drawings.
16.	Car Lighting Power Supply:	120 volts, single phase, 15 Amp, 60 Hz, AC.
17.	Control Operation:	Simplex Selective Collective.
		Location of car operating station shall comply with the requirements
		of ADA and ANSI A117.1 for use by the physically handicapped.
18.	Safety and Buffers:	Emergency terminal stopping device, spring buffers.
19.	Door Operation:	Powered.
20.	Signals:	Illuminated buttons with stainless steel metal button targets.
		Located in car front panel. Illuminated buttons at each landing
		location and position indicator in car.
21.	Painting:	All exposed metal work, not already selected as stainless steel,
	-	furnished by elevator manufacturer or installer shall be
		electrostatically painted by paint subcontractor after erection.
22.	Fixtures:	Fixture face plate finish shall be satin stainless steel #4.
23.	Pit:	Depth as indicated on Drawings.
24.	Telephone:	Flush mounted hands free elevator telephone, as per manufacturer.
25.	Hydraulic Fluid:	Standard, petroleum-based hydraulic oil.
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2.03 EQUIPMENT: MACHINE COMPONENTS

- A. The hydraulic system shall be of compact design suitable for operation under the required pressure. The power component shall be mounted in the hydraulic-fluid storage tank. The control valve shall control flow for up and down directions hydraulically and shall include an integral check valve. A control section including control solenoids shall direct the main valve and control: up and down starting, acceleration, transition from full speed to leveling speed, up and down stops, pressure relief and manual lowering. All of these functions shall be fully adjustable for maximum smoothness and to meet contract conditions. System to be provided with a low-pressure switch and a shut-off valve.
- B. The entire hydraulic system with hydraulic-fluid storage tank, power component and valves shall be located in the hoistway pit and be easily accessible for maintenance through an access door in the hoistway wall.
- C. A microprocessor-based controller shall be provided, including necessary starting switches together with all relays, switches, solid-state components and hardware required for operation, including door operation, as described herein. A three (3) phase overload device shall be provided to protect the motor against overloading.
- D. The controller shall be located together with the hydraulic system in the hoistway pit and be easily accessible for maintenance through the same access door that is also used for the hydraulic system.
- E. A manual lowering feature shall permit lowering the elevator at slow speed in the event of power failure or for adjusting purposes.
- F. Pressure Switch

2.04 EQUIPMENT: HOISTWAY COMPONENTS

A. Plunger(s) and Cylinder(s): Each cylinder shall be constructed of steel pipe of sufficient thickness and suitable for the operating pressure. The top of each cylinder shall be equipped with a cylinder head with a drip ring to collect any oil seepage as well as an internal guide ring and self-adjusting packing. Each plunger shall be constructed of selected steel tubing or pipe of proper diameter machined true and smooth with a fine polished finish. Each plunger shall be provided with a stop ring electrically

welded to it to prevent the plunger from leaving the cylinder. Each plunger and cylinder shall be installed plumb and shall operate freely with minimum friction.

- B. Car Guide Rails: Tee-section steel rails with brackets and fasteners.
- C. Polyurethane type buffers shall be used.
- D. Wiring: Wiring for hoistway electrical devices included in scope of the elevator system, hall panels, pit emergency stop switch, and the traveling cable for the elevator car.
- E. Hoistway Entrances:
 - 1. Frames: Entrance frames shall be of bolted construction for complete one-piece unit assembly. All frames shall be securely fastened to fixing angles mounted in the hoistway and shall be of UL fire rated steel.
 - 2. Sills shall be extruded aluminum finish.
 - 3. Doors: Entrance doors shall be of metal construction with vertical channel reinforcements.
 - 4. Fire Rating: Entrance and doors shall be UL fire rated for 1-1/2 hours.
 - 5. Entrance Finish: Satin finish stainless steel.
 - Entrance marking plates: Entrance jambs shall be marked with 4" x 4" (102 mm x 102 mm) plates having raised floor markings with Braille located adjacent to the floor marking. Marking plates shall be provided on both sides of the entrance.
 - 7. Sight Guards: sight guards will be furnished with all doors painted to match with painted doors, painted black for stainless steel and gold satin doors.
- F. Fascia: Galvanized sheet steel shall be provided at the front of the hoistway.

2.05 EQUIPMENT: CAR COMPONENTS

A. Cab:

- 1. Steel Shell Cab with laminated vertical removable panels.
- 2. Laminate to be selected from manufacturer's entire catalog of choices.
- 3. Black vinyl reveals between panels.
- B. Car Front Finish: Satin Stainless Steel.
- C. Car Door Finish: Satin Stainless Steel.
- D. Ceiling Type:
 - 1. Flat steel ceiling.
 - 2. Finish painted, Real White.
 - 3. Include 4 LED lights recessed flush into ceiling panel.
- E. Emergency Car Lighting: An emergency power unit employing a 6-volt sealed rechargeable battery and totally static circuits shall be provided to illuminate the elevator car in the event of building power failure.
- F. Fan:
 - 1. A one-speed 120 VAC fan will be mounted to the structural ceiling to facilitate in-car air circulation, meeting A17.1 code requirements.
 - 2. The fan shall be rubber mounted to prevent the transmission of structural vibration and will include a baffle to diffuse audible noise.
 - 3. A switch shall be provided in the car-operating panel to control the fan.
- G. Handrail:

- 1. Shall be provided on the side and rear walls of the car enclosure.
- 2. Shall be 3/8" x 2" (9.5 mm x 51 mm) flat tubular handrail with a Brushed Steel Finish.
- H. Threshold: Extruded Aluminum Finish.
- I. Emergency Exit Contact: An electrical contact shall be provided on the car-top exit.
- J. Guides: Car slide type guides at the top and the bottom, unless roller type are required by the manufacturer.
- K. Platform: Car platform shall be constructed of metal.
- L. The LED ceiling lights and the fan should automatically shut off when the system is not in use and be powered back up after a passenger calls the elevator and pushes a hall button.

2.06 EQUIPMENT: SIGNAL DEVICES AND FIXTURES

- A. Car Operating Panel:
 - 1. A car operating panel shall be provided which contains all push buttons, key switches, and message indicators for elevator operation.
 - 2. The car operating panel shall have a satin stainless steel finish.
 - 3. It shall contain a bank of round stainless steel, mechanical LED illuminated buttons. Flush mounted to the panel and marked to correspond to the landings served. All buttons to have raised numerals and Braille markings with:
 - 4. Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo.
 - 5. The car operating panel shall be equipped with the following features:
 - a. Raised markings and Braille to the left hand side of each push-button.
 - b. Car Position Indicator at the top of and integral to the car operating panel.
 - c. Door open and door close buttons.
 - d. Inspection key-switch.
 - e. Elevator Data Plate marked with elevator capacity and car number.
 - f. Help Button: The help button shall initiate two-way communication between the car and a location inside the building, switching over to another location if the call is unanswered, where personnel are available who can take the appropriate action. Visual indicators are provided for call initiation and call acknowledgement.
 - g. Landing Passing Signal: A chime bell shall sound in the car to signal that the car is either stopping at or passing a floor served by the elevator.
 - h. In car stop switch (toggle or key unless local code prohibits use).
 - i. Firefighter's hat.
 - j. Firefighter's Phase II Key-switch.
 - k. Call Cancel Button.
 - I. Firefighter's Phase II Emergency In-Car Operating Instructions: worded according to A17.1 2000, Article 2.27.7.2.
- B. Car Position Indicator: Digital, LED car position indicator shall be integral to the car operating panel.
- C. Hall Fixtures:
 - 1. Shall be provided with necessary push buttons and key switches for elevator operation.
 - 2. Shall feature round stainless steel, mechanical buttons marked to correspond to the landings.
 - 3. Shall be located in the entrance frame face.
 - 4. Buttons shall be in vertically mounted fixture.
 - 5. Fixture shall be satin stainless steel.
 - 6. Flat Flush Mounted satin stainless steel button with blue or white LED illuminating halo.
- D. Car Lantern and Chime:

- 1. A directional lantern visible from the corridor shall be provided in the car entrance.
- 2. When the car stops and the doors are opening, the lantern shall indicate the direction in which the car is to travel and a chime will sound.
- E. Access Key-Switch: Provide at every landing location, mounted in entrance jamb.

2.07 <u>WIRING</u>

A. All wiring and electrical interconnections shall comply with all governing codes. Insulated wiring shall have flame retardant and moisture proof outer covering, and shall be run in conduit, tubing or electrical wire ways. Traveling cables shall be flexible and suitably suspended to relieve stain on individual conductors.

2.08 HOISTWAY

A. Normal terminal stopping devices shall be provided. When an emergency terminal stopping device is also required, it shall be furnished and the controller switches and circuitry arranged in accordance with requirements of the ANSI Code.

2.09 PIT SWITCH

A. An emergency stop switch shall be located in the pit.

2.10 EMERGENCY PROTECTION

A. Emergency Return Unit:

Elevator shall be provided with a safety switch as an auxiliary power supply that activates automatically when the building loses power. The Emergency Return Unit shall provide operation so as to return the car to the lowest level, or other main level if designated, in case of power failure or activation of the building fire alarm or fire sprinkler system, and open the doors to allow for egress. Once all passengers have exited safely, the unit shall remain parked with the doors closed until normal power has been restored.

B. Shunt Trip Shutdown:

Where elevator hoistways and equipment spaces containing control equipment are protected with automatic sprinklers within, a means shall be provided to automatically disconnect the main line power supply to the affected elevator prior to the application of water within the hoistway or equipment room. This means shall not be self-resetting. The activation of sprinklers outside the hoistway or equipment room shall not disconnect the main line power supply.

This means shall be in full accordance with NFPA 72 and ANSI/ASMA A17.1.

2.11 SIMPLEX SELECTIVE COLLECTIVE OPERATION

- A. At each terminal landing a single keyed button shall be provided.
- B. Operation shall be automatic by means of the car and landing buttons. Stops registered by the momentary actuation of the car buttons shall be made irrespective of the number of buttons actuated or of the sequence on which the buttons are actuated. Access to any basement and penthouse floor levels will be limited by key operation in lieu of push button.
- C. Stops registered by the momentary actuation of the landing buttons shall be made in order in which the landings are reached in each direction of travel after the buttons have been actuated. All stops shall be subject to the respective car or landing button being actuated sufficiently in advance of the arrival of the car at that landing to enable the stop to be made. The direction of travel of a car shall be established by the first car or landing button actuated.

D. UP landing calls shall be answered while the car is traveling in the up direction and DOWN landing calls shall be answered while the car is traveling down. The car shall reverse after the uppermost or lowermost car or landing call has been answered and proceed to answer car calls and landing calls registered in the opposite direction of travel. If no other calls are registered the car shall proceed to the lowest landing where it will park.

2.12 <u>TELEPHONE</u>

A. Provide, furnish, and install a flush mounted telephone with push button. Computer recording shall identify origin of call, then the parties in the cab can speak. There is no physical receiver to hold. Include Braille text, indicator lights that tell user when to speak and when help is on the way, built in dual dialer and is programmable form any telephone line with a programmable voice message, programmable auto disconnect. Requires a dedicated phone line.

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to beginning the installation of lift equipment, examine the related construction and verify that no irregularities exist that would affect quality of execution of work as specified. Installation of equipment constitutes acceptance of the existing conditions.

3.02 INSTALLATION

- A. Install lift equipment in accordance with manufacturers directions and ANSI/ASME A17.1
- B. Install machine equipment within hoistway with clearances complying with applicable codes.
 Install door and frame in side of hoistway for access as directed by manufacturer and with clearances as required to not interfere with elevator operation.
- C. Install items so that they may be removed by portable hoists or other means for easy maintenance.
- D. Install rails continuously for full height of hoistway with no gap at joints. Align rails vertically within a tolerance of 1/16" in 100 ft.

3.03 FIELD QUALITY CONTROL

- A. Provide all personnel, equipment and instruments required for inspection and testing. Arrange for acceptance inspection required by local authority performed by enforcing agency.
- B. In addition to inspection and test required by local authorities, perform all applicable inspections and tests contained in ANSI/ASME A17.2.
- C. Upon completion of installation and before final approval and final payment, make a contract load test in the presence of the Architect with full maximum load on car to determine whether the equipment as installed meets the speed, capacity and all other requirements of the specifications.

3.04 ADJUST AND CLEAN

- A. Adjust brakes, controller, leveling switches, generators, limit switches, stopping switches and safety governors to operate to within accepted design tolerances. Adjust car leveling devices so car stops within $\pm 1/2$ " of finished floor. Lubricate all equipment in accordance with manufacturers instructions.
- B. Remove from hoistway surfaces all loose materials and filings resulting from this work. Clean machine room floor of dirt, oil and grease. Remove crating and packing materials from premises.

SUBMITTAL CHECK LIST

- 1. Shop Drawings.
- 2. Manufacturer's Literature.
- 3. Color Samples.

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Basic Mechanical Requirements specifically applicable to Division 15 Sections.
- B. Refer to Division 1 and Conditions of the Contract for additional requirements that apply to work of Division 15.
- C. Coordination required for submittals of mechanical and equipment utility incentives and rebates.

1.02 RELATED SECTIONS

Division 15 - Mechanical

1.03 REGULATORY REQUIREMENTS

- A. All work shall be executed and inspected in accordance with all local or state codes, laws, ordinances, rules and regulations applicable to the particular class of work.
- B. If the Contractor discovers the drawings or specifications are in conflict with the above mentioned laws, rules and regulations, he shall promptly notify the Architect in writing so any necessary changes can be accomplished. If the Contractor performs any work without notice as required above, he will bear the costs for corrective action.
- C. The Contractor is responsible for all applicable service charges, fees, permits royalties and the like.
- D. Mechanical work shall include complete, code-complying, fully operating and functional systems.

1.04 PROJECT/SITE CONDITIONS

- A. The drawings indicate required size and points of termination for pipes and ducts, and suggest proper routes of pipe to conform to structure, avoid obstructions and preserve clearances. However, it is not intended that these drawings indicate all necessary offsets and it is the Contractor=s responsibility to install piping and ducts in such a manner required to conform to structure, avoid obstructions, preserve headroom and keep openings and passageways clear without further instruction from Architect/Engineer or cost to the Owner.
- B. Contractor is responsible for co-ordinating installation and providing offsets as required for a complete and finished installation. Do not make-up duct work or piping runs until all existing conditions have been examined, work of other trades coordinated and a field coordinated layout determined. Notify Architect/Engineer of potential conflicts before making up ductwork or piping.
- C. For purposes of clearness and legibility, drawings are essentially diagrammatic, and although size and location of equipment are drawn to scale wherever possible, the Contractor shall make use of all data in all of the contract documents and shall verify this information at building site.

1.05 <u>CUTTING AND PATCHING</u>

- A. Cut existing walls, floors, ceilings, roofs, etc. necessary for the proper installation of new materials, equipment and related mechanical items. Provide all necessary framing, lintels, hangers, etc. to maintain the structural integrity of the building system after cutting.
- B. Contractor is responsible for cost to restore or patch adjacent surfaces to original condition. Employ proper professional trade for patching and finishing exposed surfaces.

1.06 UTILITY INCENTIVES AND REBATES

- A. Coordinate materials to and through the Architect as required by utility companies for submission of incentives and rebates.
- B. Provide all paperwork as requested by the Architect for this purpose on behalf of the Owner.
 - 1. Product submittals and cutsheets of all installed materials and items.
 - 2. Invoices including information such as; make/model, motor information, electrical information, SEER/EER ratings, quantities, unit prices, total costs, etc.
 - 3. Contractor shall sign all required forms as necessary for completion of the submission.
 - 4. Submittal will be coordinated through and submitted by the Architect on behalf of the Owner.
- C. Contractor may be required to coordinate timing for ordering of materials and products to correspond to time requirements by the utility granting incentive or rebate. Some products may require granting of the incentive and rebate prior to ordering of materials. This may result in ordering of materials in multiple packages and at differing times for multiple deliveries. Contractor is to coordinate these requirements as communicated by the Architect.
- D. Payment of all incentives and rebates will be made to the Owner, not the Contractor.

SECTION 15190 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to mark and identify all piping, valves, controls, ductwork, etc. throughout the project.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 09900 - Painting Section 13930 - Wet Pipe Fire Suppression Sprinklers Section 15410 - Plumbing Piping Inside Building Section 15420 - Plumbing Piping Outside Building Section 15890 - Ductwork
- 1.03
 REFERENCES

 A.
 ANSI A13.1 "Scheme for the Identification of Piping Systems".

PART 2 - PRODUCTS

- 2.01 All main elements of mechanical equipment shall be identified with signs made of laminated plastic with 1/8 inch or larger engraved letters. Signs shall be securely attached by rustproof screws or some other permanent means. Information on sign shall include name of equipment, rating, maintenance instructions, and any other important data.
- 2.02 All non-insulated piping shall be painted continuously in Mechanical Rooms where exposed, and elsewhere throughout project where exposed to view.
- 2.03 All exposed and accessible piping (above removable ceilings, etc) above 1-1/4 inch in diameter shall be identified as to function, zone, and direction of flow by means of an all-temperature adhesive backed vinyl tape. Tape for piping 3 inches and larger shall be 2-1/4 inch high with 2 inch high legend. Tape for smaller than 3 inches shall be 1-1/8 high with 3/4 inch legend. Background colors of tape shall conform to ANSI Standard A-13.1. Piping shall be identified at permanent locations, but in no case at intervals greater than 15 feet.
- 2.04 All valves shall be identified with brass tags of .051 inch thickness, 1 inch by 3 inches or larger, with 1/8 inch high stamped letters. The tag shall be attached to valves with rustproof stainless steel key chains. Valve tags shall have wording such as "Heating Water Supply" so show the function of the valve.
- 2.05 Ductwork shall be identified at or near the fan with stenciled signs or by engraved laminated plastic signs secured by rustproof screws. Sign shall show area served.

PART 3 - EXECUTION

3.01 PREPARATION

A. Complete all piping insulation and painting prior to application of tags and labels.

3.02 COLOR CODING

A. Pipe identification tape shall be as noted below:

COLOR CODING

PIPING <u>TYPE</u>	LABEL <u>COLOR</u>	LEGEND <u>TEXT</u>	TEXT <u>COLOR</u>
Domestic Cold Water	Green	"Cold Water"	Black
Domestic Hot Water	Yellow	"Dom. Hot Water"	Black
Fire Protection Water	Red	"Fire Prot. Water"	Black
Sanitary Drainage	Green	"Sanitary Sewer"	Black
Roof Drain	Green	"Roof Drain"	Black
Condensate Drainage	Green	"Condensate Drainage"	Black

SECTION 15260 - PIPING INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Piping Insulation.
- B. Jackets and Accessories.
- 1.02 <u>RELATED WORK</u> Section 15190 - Mechanical Identification Section 15410 - Plumbing Piping Inside Building Section 15510 - Hydronic Piping

1.03 <u>REFERENCES</u>

- A. ANSI/ASTM C195 Mineral Fiber Thermal Insulation Cement.
- B. ANSI/ASTM C547 Mineral Fiber Performed Pipe Insulation.
- C. ANSI/ASTM C552 Cellular Glass Block and Pipe Thermal Insulation.
- D. ASTM B209 Aluminum and Aluminum-Alloy Sheet and Plate.
- E. ASTM C449 Mineral Fiber Hydraulic setting Thermal Insulating and Finishing Cement.
- F. ASTM E84 Surface Burning Characteristics of Building Materials.

1.04 QUALITY ASSURANCE

A. Applicator:

Company specializing in piping insulation application with three years minimum experience.

 B. Materials: Flame spread/fuel contributed/smoke developed rating of 25/50/50 in accordance with ASTM E84.

1.05 <u>SUBMITTALS</u>

- A. Submit product date including thermal conductivity and standards compliance.
- B. Include product description, list of materials and thickness for each service, and locations.
- C. Submit manufacturer's installation instructions.

PART 2 - PRODUCTS

2.01 INSULATION

- A. Provide products, as approved by the Architect, from one of the following acceptable manufacturers:
 - 1. Knauf
 - 2. Certainteed
 - 3. Pittsburg Corning
 - 4. Manville
 - 5. Owens/Corning
- B. Type A:
 - 1. Glass Fiber Insulation.
 - 2. ANSI/ASTM C547; "K" value of 0.24 at 75°F; noncombustible.
 - 3. Fittings insulation shall be 25/50 pre-fittings with fiberglass inserts.

- A. Insulation Bands: 3/4 inch wide; 0.015 inch thick galvanized steel.
- B. Metal Jacket Bands: 3/8 inch wide; 0.38 thick aluminum.
- E. Fibrous Glass Cloth: Untreated; 9 oz/sq yd weight.
- F. Adhesives: Compatible with insulation.

PART 3 - EXECUTION

3.01 PREPARATION

A. Install materials after piping has been tested and approved.

3.02 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Continue insulation with vapor barrier through penetrations.
- C. In exposed piping, locate insulation and cover seams in least visible locations.
- D. On insulated piping with vapor barrier, insulate fittings, valves, unions, flanges, strainers, flexible connections, and expansion joints.
- E. On insulated piping without vapor barrier and piping conveying fluids 140°F or less, do not insulate flanges and unions at equipment, but bevel and seal ends of insulation at such locations.
- F. Provide an insert, not less than 6 inch long, of same thickness and contour as adjoining insulation, between support shield and piping, but under the finish jacket, on piping 2 inch diameter or larger, to prevent insulation from sagging at support points. Inserts shall be cork or other heavy density insulating material suitable for the planned temperature range. Factory fabrication inserts may be used.
- G. Neatly finish insulation at supports, protrusions, and interruptions.

H. Jackets:

- 1. Indoor, Concealed Applications: Insulated pipes conveying fluids above ambient temperature shall have standard jackets, with or without vapor barrier, factory-applied or field applied. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass cloth and adhesive. PVC jackets may be used.
- 2. Indoor, concealed Applications: Insulated pipes of pipes conveying fluids below ambient temperature shall have vapor barrier jackets, factory-applied or field-applied. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe, and finish with glass cloth and vapor barrier adhesive.

3.03 <u>SCHEDULE</u>

<u>PIPING</u>	<u>TYPE</u>	<u>PIPE SIZE</u>	<u>THICKNESS*</u>
Domestic Hot Water	A	< 2 inches	1/2 inch
Domestic Cold Water	A	< 2 inches	1/2 inch

SECTION 15290 - DUCTWORK INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the following work indicated, noted and detailed on drawings and specified herein:
 - 1. Ductwork Insulation.
 - 2. Insulation Jackets.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 09900 - Painting: Painting insulation jackets. Section 15190 - Mechanical Identification. Section 15890 - Ductwork: Glass fiber ductwork.
- 1.03 <u>REFERENCES</u>
 - A. ANSI/ASTM C553 Mineral Fiber Blanket and Felt Insulation.
 - B. ANSI/ASTM C612 Mineral Fiber Block and Board Thermal Insulation.
 - C. ASTM E84 Surface Burning Characteristics of Building Materials.
 - D. NFPA 255 Surface Burning Characteristics of Building Materials
 - E. UL 723 Surface Burning Characteristics of Building Materials.

1.04 QUALITY ASSURANCE

- A. Applicator: Company specializing in ductwork insulation application and can demonstrate sufficient experience and ability to execute this project.
- B. Materials: UL listed; flame spread/fuel contributed/smoke developed rating of 25/50/50 in accordance with ASTM E84.

1.05 <u>SUBMITTALS</u>

A. Include product description, list of materials and thickness for each service and location.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER

- A. Insulation
 - 1. Manville
 - 2. Knauf
 - 3. Certainteed

2.02 <u>MATERIALS</u>

A. Type A:

- 1. Flexible Glass Fiber, External Insulation.
- 2. ANSI/ASTM C612; commercial grade; "K" value of 0.29 at 75°F.
- 3. Foil scrim facing for air conditioning ducts.
- 4. 1.5 lb/cu. ft. density.

- B. Type B:
 - 1. Rigid Glass Fiber, External Insulation.
 - 2. ASNI/ASTM C612, Class 1; "K" value of 0.24 at 75°F.
 - 3. Foil scrim facing for air conditioning ducts.
 - 4. 3.0 lb/cu. ft. density.
- C. Adhesives: Waterproof fire retardant type.
- D. Indoor Jacket: Pre-sized glass cloth, minimum 7.8 oz/sq yd.
- E. Lagging Adhesive: Fire resistive to ASTM E84.
- F. Impale Anchors: Galvanized steel, 12 gauge self-adhesive pad.
- G. Joint Tape: Foil scrim facing.
- H. Tie Wire: Annealed steel, 16 gauge.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Install materials after ductwork has been tested and approved.
- B. Clean surfaces for adhesives.

3.02 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Provide insulation with vapor barrier when air conveyed may be below ambient temperature.
- C. External Insulation (Type A or Type B) Application:
 - 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesives or tape to match jacket.
 - 2. Secure insulation without vapor barrier with staples, tape or wires.
 - 3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive. Stop and point insulation around access and damper operations to allow operation without disturbing wrapping.
- D. Internal Insulation Liner (Type C) Application:
 - 1. Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical fasteners on 15 inch centers maximum on top and side of ductwork with dimension exceeding 20 inches. Seal and smooth joints. Do not use nail-type fasteners. Seal vapor barrier penetrations made by mechanical fasteners with vapor barrier adhesive.
 - 2. Ductwork dimensions indicated are net inside dimensions required for air flow. Increase ductwork to allow for insulation thickness.

3.03 <u>SCHEDULE</u>

DUCTWORK <u>TYPE</u>	INSULATION TYPE	INSULATION THICKNESS		
Supply Ducts				
(in conditioned space, in exposed locations)	В	2 inches		
(in conditioned space, in concealed locations)	A	1-1/2 inches		
(exposed to outdoor temperatures, exposed locations)	В	2 inches		
(exposed to outdoor temperatures, concealed locations)	А	(2) 1-1/2 inches		
Return and Relief Ducts				
(in conditioned space, in exposed locations)	В	2 inches		
(in conditioned space, in concealed locations)	A	1-1/2 inches		
(exposed to outdoor temperatures, exposed locations)	В	1-1/2 inches		
(exposed to outdoor temperatures, concealed locations)	А	1-1/2 inches		
Internal Duct Lining				
(for insulation)	С	1 inch		
(for acoustics only)	С	1/2 inch		

SUBMITTAL CHECK LIST

1. Product Literature.

SECTION 15410 - PLUMBING PIPING INSIDE BUILDING

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the following work indicated, noted and detailed on drawings and specified herein:
 - 1. Pipe and pipe fittings.
 - 2. Valves.
 - 3. Sanitary sewer drain, waste and vent piping system.
 - 4. Storm sewer piping system.
 - 5. Domestic water piping system
 - 6. Hose bibbs.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 15260 - Piping Insulation Section 15420 - Plumbing Piping Outside Building Section 15430 - Plumbing Specialties Section 15440 - Plumbing Fixtures

1.03 REFERENCES

- A. ASTM B88 Seamless Copper Water Tube.
- B. ASTM B306 Copper Drainage Tube (DWV).
- C. ASTM D1785 PVC Plastic Pipe, schedule 40, 80 and 120.
- D. ASTM D2665 PVC Plastic Drain, Waste and Vent Pipe and Fittings.
- E. ASTM F876/F877 Crosslinked Polyethylene (PEX) Tubing.

1.04 QUALITY ASSURANCE

A. Valves: Manufacturer's name and pressure rating marked on valve body.

1.05 <u>SUBMITTALS</u>

- A. Submit product data.
- B. Include data on pipe materials, pipe fittings, valves and accessories.

PART 2 - PRODUCTS

- 2.01 <u>SANITARY SEWER DRAIN, WASTE AND VENT PIPING</u> A. PVC Schedule 40.
 - B. Fittings: PVC Schedule 40, designed for solvent welded connections.

2.02 STORM SEWER PIPING

A. PVC Schedule 40.

B. Fittings: PVC Schedule 40, designed for solvent welded connections.

2.03 DOMESTIC WATER PIPING

Α.

- Above Grade:
 - 1. PEX Piping:
 - a. "Zurn" ZurnPEX® Non-Barrier Tubing or equal.
 - b. Conform to SDR-9 dimensional standards.
 - c. Maximum working pressures:
 - 1. 160psi @ 73°F
 - 2. 100psi @ 180°F
 - 3. 80psi @ 200°F
 - d. Pipe is to comply with all requirements of the Current Plumbing Code.
 - e. Fittings to be compatible with piping and appropriate for installation conditions.
- B. Below Grade:
 - 1. PEX Piping:
 - a. "Zurn" ZurnPEX® Non-Barrier Tubing or equal.
 - b. Conform to SDR-9 dimensional standards.
 - c. Maximum working pressures:
 - 1. 160psi @ 73°F
 - 2. 100psi @ 180°F
 - 3. 80psi @ 200°F
 - d. Pipe is to comply with all requirements of the Current Plumbing Code.
 - e. Provide PVC sleeve for pipe burial.
 - f. Provide tracer or locating wiring as required for future locates.
 - g. Fittings to be compatible with piping and appropriate for installation conditions.
- C. Valves:

1.

- 1. Shut-off service shall be gate or ball type.
- 2. Flow check service shall be swing check type.
- 3. Pressure Rating: 160 psi minimum.
- D. Water Hammer Arresters:
 - "Zurn", Z-1700 Shoktrol.
 - a. Size 100: 1-11 Fixture Units.
 - b. Size 200: 12-32 Fixture Units.
 - c. Size 300: 33-60 Fixture Units.
 - d. Size 400: 61-113 Fixture Units.
 - e. Size 500: 114-154 Fixture Units.
- 2.06 HOSE BIBBS

Α.

- Freezeless Hose Bibb:
 - 1. Freezeless wall hydrant.
 - 2. Type as indicated or scheduled on drawings. If not indicated, provide "Woodford", Model 70P.
 - If not indicated, provide "woodford", wodel 70P.
 - 3. Loose tee key or wheel handle as indicated or scheduled on drawings. If not indicated, provide loose tee key.
 - 4. Chrome.

3.01 INSTALLATION

- A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- B. Route piping in orderly manner and maintain gradient.
- C. Install piping to conserve building space and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.
- F. Provide clearance for installation of insulation and access to valves and fittings.
- G. Slope water piping and arrange to drain at low points.
- H. Prepare pipe, fittings, supports and accessories not prefinished, ready for finish painting. Refer to Section 09900.
- I. Establish invert elevations, slopes for drainage 1/8 inch per foot.
- J. Install valves with stems upright or horizontal, not inverted.
- K. No double-wye fittings will be permitted. Where the fixture/branch sanitary piping connects to the sanitary main, single wye fittings are to be used.
- L. Short 1/4 turn radius on sanitary piping elbows is prohibited.
- M. Where sanitary piping makes a change in direction, two 45-degree fittings or a "medium sweep" shall be used.

3.02 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers. Install at all plumbing fixture drops, or group of fixtures drop, above ceiling and with water hammer arrestors at the high point.
- D. Install water hammer arrestors as follows:
 - a. Install in an upright position.
 - b. Located at the remote end of a long run of piping and as close to the point of valve closure as possible, unless otherwise indicated.
 - Multiple fixtures, branch line less than 20':
 Measured from the start of the horizontal branch line to the last fixture supply on the line.
 Locate at the end of the branch line between the last two fixtures served.

Multiple fixtures, branch line more than 20':
 Measured from the start of the horizontal branch line to the last fixture supply on the line.
 Use two units whose capacities total the requirements of the branch. Locate one unit between the last and next to last fixture and the other unit approximately midway between the fixtures.

3.03 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Sterilization shall be performed in accordance with State Board of Health Rules and Regulations.
- C. Provide Certification from Board of Health after sterilization.

3.04 SERVICE CONNECTIONS

A. Provide new sanitary sewer services. Before commencing work check tap locations, invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage.

SUBMITTAL CHECK LIST

1. Product Literature

SECTION 15430 - PLUMBING SPECIALTIES

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the following work indicated, noted and detailed on drawings and specified herein:
 - 1. Floor Drains.
 - 2. Cleanouts.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 15410 - Plumbing Piping Inside Building. Section 15440 - Plumbing Fixtures.
- 1.03 <u>REFERENCES</u> A. ANSI A112.21.1 - Floor Drains.
- 1.04 QUALITY ASSURANCE
 - A. Manufacturer: For each product specified, provide components by same manufacturer throughout.

1.05 SUBMITTALS

- A. Submit shop drawings and product data.
- B. Include component sizes, rough-in requirements, service sizes and finishes.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following acceptable manufacturers:
 - 1. "Zurn".
 - 2. "Wade".
 - 3. "Josam".
 - 4. "J.R. Smith".

2.02 FLOOR DRAINS

- A. Floor Drain:
 - 1. Type as indicated or scheduled on drawings. If not indicated, provide the following items.
 - 2. "Zurn", Model ZN-415-O, where integral cleanout is not required by code.
 - 3. "Zurn", Model ZN-456-B, where integral cleanout is required by code.
 - 4. Polished nickel bronze top.
 - 5. Provide trap where required by code.

2.04 <u>CLEANOUTS</u>

- A. Clean Out:
 - 1. Type as indicated or scheduled on drawings. If not indicated, provide the following items. Cleanout shall be designed for use within the flooring material installed. Carpet locator markers are to be used in carpeted areas.
 - 2. "Zurn", Model ZN-1400-SG (outside building in concrete).
 - 3. "Zurn", Model ZN-1400-T (exposed concrete areas).
 - 4. "Zurn", Model ZN-1400-CF (carpet areas).
 - 5. "Zurn", Model ZN-1400-TX (resilient tile areas).

- 6. "Zurn", Model ZN-1400-T (tile areas).
- 7. "Zurn", Model ZN-1400-Z (terrazzo areas).
- 8. Cast iron cleanout.
- 9. Polished nickel bronze top.
- 10. Adjustable to finished surface after concrete has set.
- 11. Size to match piping it serves, full length to outlet.

PART 3 - EXECUTION

3.01 <u>PREPARATION</u>

A. Coordinate core drilling of floor construction to receive drains to required invert elevations.

3.02 INSTALLATION AND APPLICATION

- A. Install specialties in accordance with manufacturer's instructions to permit intended performance.
- B. Extend cleanouts to wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install first hanger support at the elbow connection to the horizontal pipe directly below the drain.

SECTION 15440 - PLUMBING FIXTURES

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the following work indicated, noted and detailed on drawings and specified herein:
 - 1. Water Closets and Urinals.
 - 2. Lavatories.
 - 3. Flush Valves.
 - 4. Stainless Steel Sinks.
 - 5. Faucets.
 - 6. Garbage Disposals.
 - 7. Mop Sinks and Service Sinks.
 - 8. Water Heaters.

1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 15410 - Plumbing Piping Inside Building Section 15430 - Plumbing Specialties

1.03 REFERENCES

- A. ANSI A112.6.1 Supports for Off-the-Floor Plumbing Fixtures for Public Use.
- B. ANSI A112.18.1 Finished and Rough Brass Plumbing Fixture Fittings.
- C. ANSI A112.19.1 Enameled Cast Iron Plumbing Fixtures.
- D. ANSI A112.19.2 Vitreous China Plumbing Fixtures
- E. ANSI A112.19.5 Trim for Water-Closet Bowls.

1.04 QUALITY ASSURANCE

- A. Fixtures: By same manufacturer for each product specified throughout.
- B. Trim: By same manufacturer for each product specified throughout.

1.05 <u>SUBMITTALS</u>

- A. Submit product data.
- B. Include fixtures, sizes, rough-in dimensions, utility sizes, trim and finishes.

1.06 OPERATIONAL AND MAINTENANCE DATA

- A. Submit operation and maintenance data.
- B. Include fixture trim exploded view and replacement parts lists.

1.07 <u>WARRANTY</u>

A. Provide one year manufacturer's warranty.

PART 2 - PRODUCTS

2.01 PLUMBING FIXTURES

- A. Manufacturer's model numbers are shown on plans to establish a standard of quality only. Other acceptable manufacturer's fixtures may be substituted, as approved by the Architect.
- B. See Section 01630 Product Options and Substitutions for all requirements.

2.02 ACCEPTABLE MANUFACTURERS

- A. Water Closets and Urinals:
 - 1. "American Standard"
 - 2. "Kohler"
 - 3. "Crane"
 - 4. "Eljer"
 - 5. "Zurn"
 - 6. "Toto"
- B. Lavatories:
 - 1. "American Standard"
 - 2. "Kohler"
 - 3. "Crane"
 - 4. "Eljer"
 - 5. "Zurn"
- C. Flush Valves:
 - 1. "Sloan"
 - 2. "Zurn"
 - 3. "Toto"
 - 4. "American Standard"
- D. Stainless Steel Sinks:
 - 1. "Just"
 - 2. "Elkay"
 - 3. "Kindred"
- E. Faucets:
 - 1. "Delta"
 - 2. "American Standard"
 - 3. "Kohler"
 - 4. "Zurn"
 - 5. "Chicago Faucet"
 - 6. "T&S Brass"
- F. Garbage Disposals:
 - 1. "In-Sink-Erator"
- G. Mop Sinks and Service Sinks:
 - 1. "Mustee"
 - 2. "Florestone"

H. Water Heaters:

- 1. "Lochinvar"
- 2. "Rudd"
- 3. "State"
- 4. "Bradford White"
- 5. "AO Smith"

PART 3 - EXECUTION

3.01 INSPECTION

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
- B. Verify adjacent construction is ready to receive rough-in work of this Section.

3.02 INSTALLATION

A. Install each fixture with trap, easily removable for servicing and cleaning.

- B. Provide chrome plated rigid supplies to fixtures with screwdriver stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall carriers and bolts.
- E. Seal fixtures to wall and floor surfaces with sealant, color to match fixture.
- F. See drawings for height and location of all fixtures.

3.03 ADJUSTING AND CLEANING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise or overflow.
- B. At completion clean plumbing fixtures and equipment.
- C. Solidly attach water closets to floor with lag screws. Lead flashing is not intended to hold fixture in place.

SUBMITTAL CHECK LIST

1. Product Literature

SECTION 15781 - PACKAGED ROOFTOP AIR CONDITIONING UNITS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to install complete the packaged roof top air conditioning equipment indicated, noted, detailed, and scheduled on the drawings and specified herein as follows:
 - 1. Packaged Roof Top Unit.
 - 2. Unit Controls.
 - 3. Remote Panel.
 - 4. Maintenance Service.

1.02 RELATED SECTIONS

Section 15290 - Ductwork Insulation: Duct liner. Section 15410 - Condensate Piping System.

1.03 <u>REFERENCES</u>

A. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation Systems.

- B. ARI 210 Unitary Air-Conditioning Equipment.
- C. ARI 270 Sound Rating of Outdoor Unitary Equipment.

1.04 SUBMITTALS

- A. Submit shop drawings and product data.
- B. Submit shop drawings and product data for manufactured products and assemblies required for this project.
- C. Indicate electrical service and duct connections on shop drawings or product data.
- D. Submit manufacturer's installation instructions.

1.05 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data.
- B. Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

1.06 DELIVERY, STORAGE AND HANDLING

A. Protect units from physical damage by storing off site until roof mounting frames are in place, ready for immediate installation of units.

1.07 WARRANTY

- A. Provide five year manufacturer's warranty.
- B. Warranty: Include coverage of refrigeration compressors and all unit motors and fans.

1.08 MAINTENANCE SERVICE

A. Furnish complete service and maintenance of packaged roof top units for one year from Date of Substantial Completion.

- B. Provide maintenance service with a 2 month interval as maximum time period between calls. Provide 24-hour emergency service on breakdowns and malfunctions.
- C. Include maintenance items as outlined in manufacturer's operating and maintenance date, including minimum of six filter replacements, minimum of one fan belt replacement, and controls check-out, adjustments, and recalibrations.
- D. Submit copy of service call work order or report, and include description of work performed.

1.09 EXTRA MATERIALS

A. Provide two sets of replacement filters and replace with an additional new set immediately following Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURED UNITS

- A. Provide units capable of roof-mounting
- B. Unit shall be self-contained, packaged, factory assembled and pre-wired, consisting of cabinet and frame, supply fan, heat exchanger and burner, controls, air filters, refrigerant cooling coil and compressor, condenser coil and condenser fan.
- C. Provide 0° F low ambient control, hard start and short cycle protection.

2.02 FABRICATION

- A. Cabinet: Galvanized steel with baked enamel finish, access doors or removable access panels with quick fasteners, screwdriver operated flush cam type. Structural members shall be minimum 18 gauge, with access doors or removable panels of minimum 20 gauge.
- B. Insulation: One inch thick neoprene coated glass fiber on surfaces where conditioned air is handled. Protect edges from erosion.
- C. Heat Exchangers: Aluminized steel, of welded construction.
- D. Supply Fan: Forward curved centrifugal type, resiliently mounted with V-belt drive, adjustable variable pitch motor pulley, and rubber isolated hinge mounted motor. Isolate complete fan assembly.
- E. Air Filters: One inch thick glass fiber disposable media in metal frames.

2.03 <u>BURNER</u>

- A. Gas Burner: Induced draft type burner with adjustable combustion air supply, pressure regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing device, and automatic 100 percent shut-off pilot.
- B. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve unit pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after air flow provide and slight delay, allow gas valve to open.
- C. High Limit Control: Temperature sensor with fixed stop at maximum permissible setting, de-energize burner on excessive bonnet temperature and energize burner when temperature drops to lower safe value.

D. Supply Fan Control: Temperature sensor sensing bonnet temperatures and independent of burner controls, or adjustable time delay relays with switch for continuous fan operation.

2.04 EVAPORATOR COIL

- A. Provide copper tube aluminum fin coil assembly with galvanized drain pan and connection.
- B. Provide capillary tubes or thermostatic expansion valves for units of 6 tons capacity and less, and thermostatic expansion valves and alternate row circuiting for units 7.5 tons cooling capacity and larger.

2.05 <u>COMPRESSOR</u>

- A. Provide hermetic or semi-hermetic compressor, 3600 RPM maximum, resiliently mounted with positive lubrication, crankcase heater, high and low pressure safety controls, motor overload protection, suction and discharge service valves and gauge ports, and filter drier.
- B. Five minute timed off circuit shall delay compressor start.
- C. Outdoor thermostat shall energize compressor above 45°F ambient.
- D. Provide step capacity control by cycling compressors.

2.06 CONDENSER

A. Provide copper tube aluminum fin coil assembly with sub-cooling rows.

- B. Provide direct drive propeller fans, resiliently mounted with fan guard, motor overload protection, wired to operate with compressor.
- C. Provide outdoor thermostat to cycle condenser fans.

2.07 SUPPLY/RETURN CASING

- A. Dampers: Provide manual outside air dampers for fixed outside air quantity.
- B. Gaskets: Provide tight fitting dampers with edge gaskets.

2.08 OPERATING CONTROLS

- A. Provide low voltage, adjustable electronic 7-day programmable night set back thermostat to control burner operation, compressor and condenser fan, and supply fan to maintain temperature setting.
 - 1. Include system selector switch heat-off-cool and fan control switch auto-on.
 - 2. Locate thermostat in room as shown.
- B. Provide remote mounted fan control switch on-auto.
- C. Provide night control energized by central time clock to maintain lower thermostat setting for night an unoccupied operation.

2.09 OPERATING CONTROLS - SINGLE ZONE UNITS

- A. Electronic solid state microcomputer based room thermostat, located as indicated in service area with remote sensor located as indicated.
- B. Room thermostat shall incorporate:
 - 1. Automatic switching from heating to cooling.

- 2. Preferential rate control to minimize overshoot and deviation from set point.
- 3. Set-up for four separate temperatures per day.
- 4. Instant override of setpoint for continuous or timed period from one hour to 31 days.
- 5. Short cycle protection.
- 6. Programming based on weekdays, Saturday and Sunday.
- 7. Switch selection features including imperial or metric display, 12 or 24 hour clock, keyboard disable, remote sensor, fan on-auto.
- C. Room thermostat display shall include.
 - 1. Time of day.
 - 2. Actual room temperature.
 - 3. Programmed temperature.
 - 4. Programmed time.
 - 5. Duration of timed override.
 - 6. Day of week.
 - 7. System model indication: heating, cooling, auto, off, fan auto, fan on.
 - 8. State (heating or cooling) operation.
- D. Provide locking plastic cover in public areas

PART 3 - EXECUTION

- 3.01 EXAMINATION
 - A. Verify that roof is ready to receive work and opening dimensions are as illustrated by the manufacturer.
 - B. Verify that proper power supply is available.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mount units on factory built roof mounting frame providing watertight enclosure to protect ductwork and utility services. Install roof mounting frame level.
- C. Pipe condensate line to nearest roof drain.

3.03 MANUFACTURER'S FIELD SERVICES

A. Provide initial start-up and shut-down during first year of operation, including routine servicing and check-out.

SECTION 15890 - DUCTWORK

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the following work indicated, noted and detailed on drawings and specified herein:
 - 1. Low pressure ductwork.
 - 2. Duct cleaning.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 09900 - Painting: Weld priming, weather resistant, paint of coating. Section 15290 - Ductwork Insulation. Section 15940 - Air Outlets and Inlets.

Section 15990 - Testing, Adjusting and Balancing.

1.03 <u>REFERENCES</u>

- A. ASHRAE Handbook 1985 Fundamentals: Chapter 33 Duct Design.
- B. ASHRAE Handbook 1988 Equipment: Chapter 1 Duct Construction.
- C. ASTM A 90 Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
- D. ASTM A 167 Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip.
- E. ASTM A 525 General Requirements for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process.
- F. ASTM A 527 Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
- G. ASTM B209 Aluminum and Aluminum Alloy Sheet and Plate.
- H. NFPA 90A Installation of Air Conditioning and Ventilating System.
- I. NFPA 90B Installation of Warm Air Heating and Air Conditioning Systems.
- J. NFPA 96 Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooling Equipment.
- K. SMACNA HVAC Duct Construction Standards.
- L. SMACNA Fibrous Glass Duct Construction Standards.
- M. UL 181 Factory-Made Air Ducts and Connectors.

1.04 DEFINITIONS

A. Duct Sizes:

Inside clear dimensions. For lined ducts, maintain sizes inside lining.

- B. Low Pressure. Three Classifications:
 - 1. 1/2 inch WG positive or negative static pressure and velocities less than 2,000 fpm.
 - 2. 1 inch WG positive or negative static pressure and velocities less than 2,500 fpm.
 - 3. 2 inch WG positive or negative static pressure and velocities less than 2,500 fpm.

1.05 REGULATORY REQUIREMENTS

A. Construct ductwork to [NFPA 90A] and [NFPA 90B] and [NFPA 96] standards.

DUCTWORK

PART 2 - PRODUCTS

2.01 <u>MATERIALS</u>

- A. General: Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.
- B. Steel Ducts: ASTM A525 or ASTM A527 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz. per sq. ft. for each side in conformance with ASTM A90.
- C. Aluminum Ducts: ANSI/ASTM B209; aluminum sheet, alloy 3003-H14. Aluminum Connectors and Bar Stock: Alloy 6061-16 or equivalent strength.
- D. Flexible Ducts: Interlocking spiral of galvanized steel or aluminum construction or fabric supported by the helically wound spring steel wire or flat steel bands; rated to 2 inches WG positive and 1.5 inches WG negative for low pressure ducts and 15 inches WG positive or negative for medium high pressure ducts. UL-81 listed with 1 inch R-4.2 fiberglass insulation. Polyethylene vapor barrier jacket. Multi-ply metalized polyester core.
- E. Insulated Flexible Ducts: Flexible duct wrapped with flexible glass fiber insulation, enclosed by seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75°F.
- F. Fibrous Glass Ducts: UL 181; one inch 1-1/2 inch thick rigid glass fiber with aluminum foil, glass scrim and kraft on plastic jacket vapor barrier; max. 0.23 K value at 75°F.
- G. Stainless Steel Ducts: ASTM A167, Type 304.
- H. Fasteners: Rivets, bolts or sheet metal screws.
- I. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
- J. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end, on continuously threaded.

2.02 LOW PRESSURE DUCTWORK

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing and sealing for operating pressures indicated.
- B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
- C. Construct T=s, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
- E. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.

- F. Connect flexible ducts to metal ducts with adhesive only, liquid adhesive plus tape, draw bands, adhesive plus sheet metal screws.
- G. Use crimp joints with or without bead for joining round duct sizes 8 inches and smaller with crimp in direction of air flow.
- H. Use double nuts and lock washers on threaded rod supports.
- I. Designed for static pressure rating up to 2" w.c.

PART 3 - EXECUTION

- 3.01 INSTALLATION
 - A. Obtain manufacturer's inspection and acceptance of fabrication and installation of glass fiber ductwork at beginning of installation.
 - B. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
 - C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
 - D. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.02 DUCTWORK APPLICATION SCHEDULE

AIR SYSTEM	MATERIAL
Low Pressure Supply (System with Cooling Coils)	Steel, Aluminum
Return and Relief	Steel, Aluminum
General Exhaust	Steel, Aluminum

3.03 ADJUSTING AND CLEANING

- A. Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.
- B. Clean duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

SECTION 15940 - AIR OUTLETS AND INLETS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to complete the following work indicated, noted and detailed on drawings and specified herein:
 - 1. Diffusers.
 - 2. Diffuser boots.
 - 3. Registers/grilles.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Section 09900 - Painting: Painting of ductwork visible behind outlets and inlets. Section 10200 - Louvers and Vents: Architectural air intake and exhaust louvers. Section 15890 - Ductwork. Section 15990 - Testing, Adjusting and Balancing.

1.03 <u>REFERENCES</u>

- A. ADC 1062 Certification, Rating and Test Manual.
- B. AMCA 500 Test Method for Louvers, Dampers and Shutters.
- C. ANSI/NFPA 90A Installation of Air Conditioning and Ventilating Systems.
- D. ARI 650 Air Outlets and Inlets.
- E. ASHRAE 70 Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.
- F. SMACNA Low Pressure Duct Construction Standard.
- 1.04 QUALITY ASSURANCE
 - A. Test and rate performance of air outlets and inlets in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.
 - B. Test and rate performance of louvers in accordance with AMCA 500.

1.05 <u>REGULATOR REQUIREMENTS</u>

A. Conform to ANSI/NFPA 90A.

1.06 SUBMITTALS

A. Provide product date for items required for this project.

- B. Submit schedule of outlets and inlets indicating type, size, location, application and noise level.
- C. Review requirements of outlets and inlets as to size, finish and type of mounting prior to submitting product data and schedules of outlets and inlets.
- D. Submit manufacturer's installation instructions.

Α.

2.01 CEILING DIFFUSERS - ACCEPTABLE MANUFACTURERS

- Provide products, as approved by the Architect, form one of the following acceptable manufacturers:
 - 1. "Price".
 - 2. "Titus".
 - 3. "Krueger".
 - 4. "Carnes".
 - 5. "Anemostat".
 - 6. "Nailor".

2.02 CEILING DIFFUSERS -ROUND

- A. Round, adjustable patter, stamped or spun, multicore type diffuser to discharge air in 360 degree pattern, with sectorizing baffles where indicated.
- B. Project diffuser collar not more than one inch above ceiling face and connect to duct with duct ring. In plaster ceiling, provide plaster ring and ceiling plaque.
- C. Fabricate of steel with baked enamel off-white finish.
- D. Provide radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.03 <u>CEILING DIFFUSERS - RECTANGULAR</u>

- A. Rectangular, adjustable pattern, stamped, multicore type diffuser to discharge air in 360 degree pattern with sectorizing baffles where indicated.
- B. Provide type frame as appropriate for ceiling in which it is to be installed. In plaster ceilings, provide plaster frame and ceiling frame.
- C. Fabricate of steel with steel or aluminum frame and baked enamel off-white finish.
- D. Provide radial opposed blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.04 CEILING REGISTERS/GRILLES - EXHAUST AND RETURN

- A. Streamlined blades, depth of which exceeds 3/4 inch spacing, with spring or other device to set blades, vertical or horizontal face, as selected by the Architect.
- B. Fabricate 1-1/4 inch margin frame with countersunk screw mounting.
- C. Fabricate of steel with 20 gauge minimum frames and 22 gauge minimum blades, steel and aluminum with 20 gauge minimum frame, or aluminum extrusions, with factory baked enamel finish.
- D. Where not individually connected to exhaust fans, provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.
- E. In gymnasiums, blades shall be front pivoted, welded in place or securely fastened to be immobile.

2.05 <u>CEILING REGISTERS/GRILLES - GRID CORE EXHAUST AND RETURN</u>

A. Fixed grilles of 1/2 inch x 1/2 inch x 1/2 inch louvers.

- B. Fabricate 1-1/4 inch margin frame with countersunk screw mounting. Lay-in frame for suspended grid ceilings.
- C. Fabricate of aluminum with factory baked enamel finish.
- D. Where not individually connected to exhaust fans, provide integral, gang-operated opposed blade dampers with removable key operator, operable from face.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install items in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry and lighting arrangement. Refer to Section 09900 for finishes.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffusers, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09900.

SECTION 15990 - TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required to complete all testing, adjusting and balancing of supply, return and exhaust air system.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 15781 - Packaged Roof Top Air Conditioning Units Section 15890 - Ductwork Section 15940 - Air Outlets and Inlets
- 1.03 <u>REFERENCES</u>
 - A. AABC Associated Air Balance Council.
 - B. NEBB National Environmental Balancing Bureau.
- 1.04 QUALITY ASSURANCE
 - A. Testing, Adjusting and Balancing: Follow methodology and procedures of AABC of NEBB.
 - B. Report: Record and Format date in conformance with guidelines of AABC or NEBB.

1.05 SUBMITTALS

A. Submit test reports including identification and types of instruments used.

PART 2 - PRODUCTS

2.01 PROVIDERS

- A. Services shall be provided by one of the following acceptable providers:
 - 1. Fulton Air Balance.
 - 2. Midwest Balance and Service, Inc.
 - 3. Thermal Balance, Inc.
 - 4. Total Balance, Inc.

PART 3 - EXECUTION

3.01 AIR SYSTEM PROCEDURES

- A. Adjust all furnaces and exhaust fans to provide the required design air quantity to or through, each component, including supply air, return air, ventilation air and exhaust air with minimum fan energy requirements.
- B. Use volume dampers at branch runout connections to mains to adjust flows. Avoid using volume dampers at diffuser or register.
- C. Make final measurements of air quantity after the air terminal has been adjusted for optimum flow.

3.02 AIR SYSTEM DATA

- A. Report shall include for each fan:
 - 1. Manufacturer and model.
 - 2. Size.
 - 3. Motor HP, voltage, phase, cycles and full load amps.
 - 4. Location and local identification data.
 - 5. Measured CFM.
 - 6. Measured inlet and outlet static pressures.
 - 7. Measured RPM.
 - 8. Motor operating BHP.
 - 9. Motor operating K W.

B. Report shall include for each diffuser, grille and register:

- 1. Size, type and manufacturer.
- 2. Location and area on drawing.
- 3. Design CFM.
- 4. Final measured CFM.

SECTION 16010 - SUMMARY OF ELECTRICAL WORK

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish and install a complete electrical system, as specified and shown on drawings.
- B. Provide all items, articles, materials, operations or methods listed, mentioned or scheduled on the drawings and/or herein, including all labor, materials, equipment and incidentals necessary and required for their completion.
- C. All work shall be installed as per drawings, specifications and electrical code. Where one contradicts the other the greater shall be used.
- D. Coordination required for submittals of electrical and lighting utility incentives and rebates.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. The General Provisions of the Contract, including General and Supplementary Conditions and Division 1, apply to all sections of work specified in this Division 16.

PART 2 - PRODUCTS

- 2.01 GENERAL
 - A. All materials shall be new and bear the manufacturer's name, trade name and UL label in every case where a standard has been established for the particular material. The materials to be furnished under each section of the specifications shall be the manufacturer's latest approved design.
 - B. Materials shall be delivered to the site and stored in original containers and be readily accessible for inspection by the Architect/Engineer until installed.
 - C. Materials of the same general type shall be of the same make throughout the project to provide a uniform appearance, operation and maintenance.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All work performed under this section must be done by workmen skilled in their respective trades. All work must present an appearance typical of the best trade practices. Any work not installed in this manner shall be repaired, removed and replaced or otherwise remedied as directed by the Architect/Engineer.
- B. Manufacturer's direction shall be followed completely in the delivery, storage, protection and installation of all equipment and materials. The Contractor shall promptly notify the Architect/Engineer, in writing, of any conflict between any requirement of the Contract Documents and the manufacturer's directions or such written instructions from the Architect/Engineer, before proceeding with the work.

C. All work and equipment installed under Division 16 work shall be supported, plumbed, rigid and true to line. All Architectural, Structural, Mechanical, Electrical and Fire Protection drawings, shop drawings and catalog data, shall be studied thoroughly, to determine how equipment, fixtures and conduit, etc., are to be supported, mounted or suspended, and shall provide extra steel bolts, inserts, brackets and accessories for proper support whether or not show on the drawings. When directed, drawings shall be submitted showing supports for approval.

3.02 MISCELLANEOUS STEEL

- A. Provide all necessary miscellaneous steel angles, channels, rods, etc., for hanging, mounting or suspending equipment, fixtures, devices, etc., installed under Division 16 work.
- B. Supports installed under Division 16 work shall be suitably fastened to building structural members in a manner approved by Architect/Engineer

3.03 SPECIAL SEALS

- A. After conduits and tubing are installed, the spaces around conduits shall be sealed.
- B. Sealing of all spaces created for the electrical systems shall be in accordance with the requirements of the fire inspector and governing codes.

3.04 UTILITY INCENTIVES AND REBATES

- A. Coordinate materials to and through the Architect as required by utility companies for submission of incentives and rebates.
- B. Provide all paperwork as requested by the Architect for this purpose on behalf of the Owner.
 - 1. Product submittals and cutsheets of all installed materials and items.
 - 2. Invoices including information such as; make/model, quantities, unit prices, total costs, etc.
 - 3. Contractor shall sign all required forms as necessary for completion of the submission.
 - 4. Submittal will be coordinated through and submitted by the Architect on behalf of the Owner.
- C. Contractor may be required to coordinate timing for ordering of materials and products to correspond to time requirements by the utility granting incentive or rebate. Some products may require granting of the incentive and rebate prior to ordering of materials. This may result in ordering of materials in multiple packages and at differing times for multiple deliveries. Contractor is to coordinate these requirements as communicated by the Architect.
- D. Payment of all incentives and rebates will be made to the Owner, not the Contractor.

SECTION 16015 - ELECTRICAL COORDINATION

PART 1 - GENERAL

1.01 COORDINATION

- A. The Contractor is responsible for the proper coordination of the work specified herein.
- B. Any apparatus, appliance, material or work not shown on the drawings, but mentioned in the specifications or vice versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered and installed under Division 16 work.
- C. Minor adjustments in location of conduit, boxes, and/or equipment shall be made at no additional charge if so directed prior to their installation. Where offsets in conduits, additional fittings, necessary junction boxes, pull boxes, devices, etc., are required to complete the installation, to clear obstructions or the work of other trades, or for the proper operation of the system, these shall be deemed to be included in the Contract and shall be furnished and installed complete under Division 16 work.
- D. The Contractor shall exchange complete original and revised drawings, details, information, etc., such that all installations are properly coordinated and fit together into a complete and acceptable project.
- E. Where Division 16 work will be installed in proximity to other work or where there is evidence that the Division 16 work will interfere with other work the contractor shall assist in working out space conditions to make a satisfactory adjustment. If so directed by Architect/Engineer, the contractor shall prepare composite working drawings and sections at a suitable scale not less than 1/4 inch 1'-0", clearly showing how work is to be installed in relation to other work. If Division 16 work is installed before coordinating with other work, or so to cause interferences with other work, the contractor shall make necessary changes in the work to correct the condition.
- F. The contractor shall arrange for all chases in walls, slots in beams, openings in floor or roof, etc., required for the installation of pipes, ducts, conduits, etc., and be held responsible for the proper location of chases required for the work. The contractor shall further be responsible for having work that is required to be built in, on hand in time for proper progress.
- G. The contractor shall make all measurements in the field and shall be responsible for correct fittings. The contractor shall coordinate this work with all other divisions in such a manner as to cause a minimum of conflict or delay. Division 16 work shall be coordinated in advance with other work and report immediately any difficulty which can be anticipated before installing work in question.
- H. The contractor shall coordinate with other work for proper location of roughing-in an connection to equipment.
- I. Refer to Architectural, Structural, Mechanical Drawings and Specifications for construction features, floor and ceiling elevations, finishes, grade elevations, work in other divisions, size and location of pipe chases and head room for same, location of walls, partitions, beams, etc., swing of doors, switches and electrical outlets and the order and time of placement of all work. No work to proceed until all details affecting or affected by these conditions have been completely developed and properly resolved.

1.02 VISIT THE PREMISES

A. The contractor is directed to visit the premises and become thoroughly familiar with the general layout of the building site and the location of the present utility lines to which connection will be made before

submitting a proposal.

- B. The contractor shall also check present grades, ditches, pavements, sewers and/or any other conditions affecting the installation of electrical ducts and utilities under the Contract.
- C. Offsets which may be required to leave new work clear, etc., will be included in the proposal, and the contractor assumes full responsibility for having made a proper and thorough investigation of these requirements.
- D. The Contract is based upon the assumption that the contractor has investigated, understands and accepts all existing conditions.
- E. While all existing storm sewers, sanitary sewers, water mains, gas mains, power lines, telephone lines and other utility services, and/or installations, both underground and overhead, may not have been indicated on the drawings, the contractor will be held expressly responsible for determining the exact location of all such service lines and/or installations encountered in the performance of the Contract and for the provision of suitable protection, support and maintenance.

1.03 SPACE REQUIREMENT

- A. It shall be the responsibility of the contractor to insure that items to be furnished fit the space available, with proper provisions for access to equipment for maintenance and replacement. The contractor shall make necessary field measurements to ascertain space requirements, including those for connections, and removal of parts, and shall furnish and install such sizes and shapes of equipment that the final installation shall suit the true intent and meaning of the drawings and specifications.
- B. All installations shall be made to maintain maximum headroom and clearance around equipment. When space and/or headroom appear inadequate, Contractor shall notify Architect/Engineer prior to proceeding with the installation.
- C. All equipment which must be serviced, operated or maintained shall be located in fully accessible positions. Minor deviations from the contract drawings may be made to allow for better accessibility, but changes of magnitude or which involve extra cost shall not be made without prior approval.
- D. The contractor is responsible to determine that the equipment and appliances which are furnished can be brought into the building. No extra compensation will be allowed for dismantling of equipment to install in the available space or to obtain entrance into the building.
- E. Where equipment that has been approved requires different arrangement or connections from those shown, it shall be the responsibility of the contractor to install the equipment to operate properly and in harmony with the intent of the drawings and specifications. When directed by the Architect/Engineer, the contractor shall submit drawings showing the proposed installation. If the proposed installation is approved, the contractor shall make all incidental changes in conduits, supports, wiring, heaters, panelboards, etc.
- F. The contractor shall provide any additional devices, fittings, and other additional equipment required for the proper operation of the system resulting from the selection of equipment, including all required changes in affected trades. The contractor shall be responsible for the proper location of roughing in and connections by other trades.

1.04 MATERIAL STORAGE

A. All materials shall be stored in a manner that does not interfere with the progress of work. All items

shall be stored in dry spaces.

B. Materials stored within buildings as approved by the Architect/Engineer shall be distributed in such a manner as to avoid overloading of the structural frame, and never shall be concentrated in such a manner as to exceed the equivalent of fifty (50) pounds per square foot uniformly distributed loading.

SECTION 16021 - CONCRETE WORK AND ACCESS PANELS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide all access doors and panels for any and all concealed devices installed under Division 16.
- B. Access doors shall be provided for, but not be limited to junction boxes, pull boxes, etc., in otherwise inaccessible locations.
- C. Provide concrete equipment bases under all electrical equipment mounted on ground, installed under Division 16, unless otherwise indicated.
- D. Provide a minimum of 3 inch concrete encasement for underground main service feeder conduits except where conduits are run under floor slab. Maintain minimum of 3 inches between conduits where several conduits occur in the same trench.
- E. Provide concrete bases for ground-mounted area lighting units.
- 1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Section 03300 - Cast-In-Place Concrete Section 08305 - Access Doors.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Access panels shall be of sufficient size for the service intended or required or as indicated on the drawings.
- B. Minimum size shall be 12 inches x 12 inches.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Items installed above acoustical lay-in tile ceilings shall not require access doors.
- B. Provide wood boxes or frames for access panels located in plaster or ceramic tile walls. Boxes shall have proper anchoring devices and shall be installed after tile or plaster work has been completed.
- C. Housekeeping Pads:
 - 1. Provide concrete housekeeping bases under all electrical and mechanical equipment mounted on the floor or ground, installed under Division 15 or 16.
 - 2. Establish sizes and location of the various concrete bases required and provide all necessary anchor bolts together with templates for holding these bolts in position.
 - 3. Each concrete base shall be no less than 4 inches high and project 3 inches on all sides beyond the equipment.

SECTION 16025 - CODES, FEES AND STANDARDS

PART 1 - GENERAL

- 1.01 <u>CODES AND FEES</u>
 - A. Unless specifically notes to he contrary, the Contractor shall furnish all equipment materials, labor and install and test in accordance with applicable sections of latest revisions published at date of bid of the following:
 - 1. American Concrete Institute (ACI).
 - 2. American National Standards Institute (ANSI).
 - 3. American Society for Testing and Materials (ASTM).
 - 4. American Institute of Steel Construction (AISC).
 - 5. Aluminum Association (AA).
 - 6. National Board of Fire Underwriters (NBFU).
 - 7. Underwriters Laboratories Inc. (UL).
 - 8. American Iron and Steel Institutes (AISI).
 - 9. Institute of Electrical and Electronics Engineers (IEEE).
 - 10. National Electrical Manufacturers Association (NEMA).
 - 11. Insulated Cable Engineers Association (ICEA).
 - 12. National Electrical Safety Code (NESC).
 - 13. Edison Electric Institute (EEI).
 - 14 National Electric Code (NEC).
 - 15. Illuminating Engineering Society (IES).
 - 16. National Bureau of Standards (NBS).
 - 17. American Welding Society (AWS).
 - 18. Association of Edison Illumination Companies (AEIC).
 - 19. Uniform Building Code (UBC).
 - 20 American Association of State Highway and Transportation Officials (AASHTO).
 - 21. Environmental Protection Agency (EPA).
 - 22. Occupational Safety and Health Act (OSHA).
 - 23 Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA).
 - 24. Lighting Protection Institute (LPI) Standard of Practice.
 - 25. Life Safety Code (LSC).
 - 26. Local State Fire Marshall's Office (SFM).
 - 27. National Fire Protection Association (NFPA).
 - B. The provisions, rules, regulations and ordinances listed above are to be considered as much a part of these specifications as if repeated herein or attached hereto. All changes or modifications required to conform to such codes, regulations or requirements must be approved by the Architect/Engineer.
 - C. The Contractor shall comply with applicable laws, building and construction codes and applicable regulations of governing local, County, State and other applicable codes, including the Utility company. Obtain permits and inspections from authorities having jurisdiction, and pay required charges. Deliver certificates of inspection to the Architect at time of acceptance inspection.

1.02 STANDARDS

A. All materials shall be new, free of defects and shall be U.L. listed, bear the U.L. Label or be labeled or listed with and approved, nationally recognized Electrical Testing Agency. Where no labeling or listing service is available for certain types of equipment, test data shall be submitted to prove to the Engineer that equipment meets or exceeds available standards.

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1.03 UTILITY COMPANY FEES, CHARGES, COSTS

A. It is the contractor's responsibility to contact the appropriate Electric and Telephone Utility Companies to determine if any fees, charges or costs will be due to the Utility Company, as required by the Utility Company for temporary power, In/Out installations, hook-ups, surveying of easements, etc. This fee, charge or cost shall be included in the contractor's bid price.

SECTION 16050 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The other Contract Documents complement the requirements of this Section. The General Requirements apply to the work of this Section.
- B. Section 01510 Temporary Utilities
- C. Section 01520 Temporary Construction
- D. Section 01740 Cleaning

1.02 SCOPE

- A. The work shall include the furnishings of systems as defined in Section 16010 "Work Included".
- B. Drawings for the work are diagrammatic, intended to convey the Scope of the Work and to indicate the general arrangement and locations of the work. Because of the scale of the drawings, certain basic items such as conduit fittings, access panels, sleeves, pull and junction boxes may not be shown. Where such items are required by Code or by other sections, such items shall be included.
- C. Equipment Specification may not deal individually with minute items such as components, parts, controls and devices which may be required to produce the equipment performance specified or as required to meet the equipment warranties. Where such items are required, they shall be included by the supplier of the equipment, whether or not specifically indicated.
- D. Coordinate with all trades in submittal of shop drawings. Shop drawings shall detail space conditions to the satisfaction of all concerned trades, subject to review and final acceptance by the Architect. In the event that the Contractor installs work before coordinating with other trades or so as to cause any interference with work of other trades, the necessary changes shall be made in the work to correct the condition, at no additional cost to the Owner.

1.03 <u>TEMPORARY POWER AND LIGHTING</u>

Furnish, install and maintain temporary power with ground fault protection and lighting to be used by all trades during construction. See Section 16025 for In/Out fees. The entire system shall be grounded. Payment for monthly current consumption shall be the responsibility of the Contractor. Thermal magnetic breakers or cartridges fuses only shall be used for over current protection.

1.04 SUPERVISION OF THE WORK

A. Provide field superintendent who has had a minimum of four (4) years previous successful experience on projects of comparable sizes and complexity. Superintendent shall be present at all times that work under this Division is being installed or affected. Superintendent shall be a licensed Journeyman.

1.05 ELECTRICAL CONNECTIONS

A. All connections shall be tightened to the torque valves recommended by that device manufacturers instructions. If these values are not listed, tighten to pound-inch or pound-foot values recommended in UL Standard 486B, a summary of which may be found in the National Electric Code Handbook.

1.06 ACTIVE SERVICES

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A. Existing active services; water, gas, sewer, cable, fiber electric, when encountered, shall be protected against damage. Do not prevent or disturb operation of active services which are to remain. If active services are encountered which require relocation, make request to authorities with jurisdiction or determination of procedures. Where existing services are to be abandoned, they shall be terminated in conformance with requirements of the utility or Municipality having jurisdiction.

1.07 <u>TESTS</u>

- A. Systems shall be tested by the Contractor and placed in proper working order prior to demonstrating systems to Owner.
- B. After work is completed, a load balance test shall be made for each panelboard to demonstrate that with full lighting and mechanical load, the balance between phases is within 10%. Unbalanced beyond this limit shall be corrected, maintaining proper phase relation to neutral at all times. Submit to Engineer, prior to request for final inspection, a written report of existing and final load information.

1.08 DEMONSTRATIONS

- A. Prior to acceptance of the work, the Contractor shall demonstrate to the Owner, or his designated representative, all features and functions of all systems and shall instruct the Owner in the proper operation of the systems. Each system shall be demonstrated once.
- B. The demonstration shall consist of not less than the following:
 - 1. Point out the actual location of each component of a system and demonstrate its function and its relationship to other components within the system.
 - 2. Demonstrate the electrical system by actual "start-stop" operation showing how to work controls, how to reset protective devices, how to replace fuses, and what to do in an emergency.
 - 3. Demonstrate communication, signal, alarm and detection systems by actual operation of the systems and show how to reset signal, alarm and detection devices.
- C. Systems to be demonstrated shall include but not be limited to the following:
 - 1. Service and power distribution systems.
 - 2. Lighting and lighting control systems.
 - 3. Emergency lighting systems.
 - 4. Motor and equipment control.
 - 5. Fire alarm system.
 - 6. Intercom and paging system.
 - 7. Program bell system.
 - 8. Security system.
 - 9. HVAC time control system.
- D. Contractor shall furnish the necessary trained personnel to perform the demonstrations and instructions, and if necessary shall arrange to have the manufacturer's representatives present to assist with the demonstrations. The Contractor shall allow one (1) day for performing prescribed demonstrations.
- E. The Contractor shall arrange with the Owner the dates and times for performing each demonstrations.

1.09 IDENTIFICATION

- A. The Contractor shall provide identification for wiring systems and equipment.
- B. Lettering for identification of fire alarm, telephone, TV, security, P.A. etc., shall be of sign painters

quality or stencil lettering. Paint shall be fast drying sign enamel. All major pull and junction boxes for these systems except fire alarm in service areas, tunnels, above accessible ceilings and in accessible chases shall have one-half inch high black lettering identifying the system. Fire alarm shall have red lettering. Example: Fire Alarm = FA, Security = SCTY, Telephone = TEL.

- C. Power and lighting circuits shall have conductors color banded, per 16120 Wire and Cable in each junction and pull box.
- D. Nameplates:
 - 1. The following, but not limited to, items shall be equipped with nameplates: All motor starters, push-button stations, control panels, time switches, disconnect switches, panel boards, contractors or relays in separate enclosures, power receptacles where the nominal voltage between any pair or contracts is greater than 150V, all switches controlling outlets or equipment where the outlets are not located within sight of the controlling switch, high voltage boxes and cabinets. Special electrical systems shall be identified at terminal cabinets and equipment racks.
 - 2. Power panels, motor control centers and switchgear without doors, shall have circuit breakers and switches identified by engraved plastic tags affixed to cabinet adjacent to device.
 - 3. Nameplates shall adequately describe the function of the particular equipment involved. Where nameplates are detailed on the drawings, inscription and size of letters shall be as shown on the shop drawings submitted for approval. Nameplates for panelboards, motor control centers and switchboards shall include the panel designation, voltage and phase of the supply. For example, "Panel PA, 120/208V, 3-phase, 4-wire". The name of the machine on the nameplates for a particular machine shall be the same as the one used on all motor starters, disconnect and P.B. station nameplates for that machine.
 - 4. Nameplates shall be laminated phenolic plastic, black front and back with white core, with lettering etched through the outer covering. Attach with plated self-tapping screws or small brass screws in un-air conditioned spaces. Namplates to identify emergency devices shall be red laminate.
- E. Panelboards shall have type-written circuit directories installed inside the doors under transparent plastic covers.

1.10 SUBMITTALS

- A. Method of preparing and procedure for submitting Shop Drawings and submittal data shall be in compliance with the general section of these specifications.
- B. Submittal data for electrical equipment shall consist of Shop Drawings and/or catalog cuts showing technical data necessary to evaluate the material or equipment, to include dimensions, wiring diagrams, performance curves, ratings, control sequence and other descriptive date necessary to describe fully the item proposed and its operating characteristics. Any submittal data in following electrical sections, peculiar to that section, is in addition to submittal requirements of this section.

1.11 EXCAVATING, TRENCHING AND BACKFILLING

A. The contractor shall do excavating necessary for underground wiring, conduit and shall backfill trenches and excavations with sand after work has been inspected. Care shall be taken in excavating that walls and footings and adjacent load bearing soils are not disturbed in any way, except where lines must cross under a wall footing. Where a line must pass under a footing, the crossing shall be made by the smallest possible trench to accommodate the conduit. Excavation shall be kept free from water by pumping if necessary. No greater length of trench shall be left open, in advance of conduit laying, than that which is required.

- B. Roots shall be removed to a minimum level of eighteen (18) inches below finish grade. No roots shall be allowed to remain under any installed electrical work.
- C. Backfill about the structures shall be placed, when practical, as the work of construction progresses. Backfilling on or against concrete work shall be done only when directed. Backfilling of duct lines shall progress as rapidly as the testing and acceptance of the finished sections of the work will permit and shall be carried to a crown approximately six (6) inches above the existing grades. In backfilling around duct lines, selected material shall be compacted firmly around and to a depth of not less than six (6) inches over the top of the duct. Fill and backfill and rough gradings shall be compacted thoroughly in layers and shall be brought up to within six (6) inches of finished grades. Fill and backfill shall be clean and free from vegetable matter and refuse.

1.12 CUTTING AND PATCHING

- A. Cut existing walls, floors, ceilings, roofs, etc. necessary for the proper installation of new materials, equipment and related electrical items. Provide all necessary framing, lintels, hangers, etc. to maintain the structural integrity of the building system after cutting.
- B. Contractor is responsible for cost to restore or patch adjacent surfaces to original condition. Employ proper professional trade for patching and finishing exposed surfaces.

SECTION 16111 - CONDUIT SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The other Contract Documents complement the requirements of this section. The General Requirements apply to the work of this Section.

1.02 <u>SCOPE</u>

- A. Furnish materials, tools, labor and supervision necessary to fabricate and install a complete electrical conduit system.
- B. Conduit systems shall be provided for all wiring systems, except where the Drawings or other Sections of the Specifications indicate that certain wiring may be installed without conduit.

1.03 STANDARDS AND CODES

- A. Methods of fabrication and installation shall copy with the provisions of all applicable Sections of the NEC.
- B. Materials shall be UL and NEC approved for the application intended.

1.04 DESCRIPTION

A. This section describes the basic materials and methods of installation for conduit systems.

1.05 QUALIFICATIONS

A. The materials used in the fabrication of the conduit system shall be products of a manufacturer regularly engaged in the manufacturing of the specified material. Where a manufacturer is named for a particular material, the material of other manufacturers shall be acceptable provided the materials meets requirements of the Specification.

PART 2 - PRODUCTS

2.01 CONDUIT

- A. Rigid Conduit: Full weight, threaded, rigid steel conduit, galvanized inside and out by hot dip or electrogalvanizing process. Additional protection by electrostatically applied baked coating. Thread protective caps and couplings shall remain in place prior to use. Rigid conduit to be used for exposed exterior installations, where subject to physical abuse and required by Code.
- B. Electrical Metallic Tubing (EMT): Thinwall, electrically welded cold rolled steel conduit, galvanized inside and out by electrogalvanized process. Use for conduit installed in stud walls, masonry walls, above suspended ceilings and were exposed in interior spaces not subject to physical abuse.

C. Flexible Metal Conduit:

Formed at one continuous length of spirally wound electrogalvanized steel strip. Use for final connections to any equipment subject to movement or vibration. Connections to fixtures shall be limited to 6 feet in length. All other connections shall be a maximum of 1'-6" in length.

Liquidtight Flexible Metal Conduit:
 Formed of one continuous length of spirally wound steel strip, with water and oil tight neoprene jacket.
 Use for final connections to equipment listed in paragraph C above when located in wet or damp areas.

E. PVC Conduit:

Conduit shall be sunlight resistant, schedule 40, 90°C. Conduit shall be composed of polyvinyl chloride and shall conform to NEMA Standards. Conduit, fittings and cement shall be produced by the same manufacturer. May be used where buried outside building, encased in concrete, or below slabs on grade. Electrical non-metallic tubing and rigid non-metallic conduit shall not be used below grade within the building. PVC conduit shall be installed in concealed location only.

- F. Type MC cable:
 - 1. May be used as approved by Code.
 - 2. Factory assembly of one or more insulated conductors enclosed in a metallic of interlocking tape.
 - 3. Install all MC cable in a neat fashion. All unacceptable MC cable installation shall be removed and replaced at the Architect's discretion. MC cable shall run with buildings member and strapped as per NEC330.
 - 4. Do not install MC cable in or on masonry walls.
 - 5. All MC cable shall be concealed.
- G. Electrical non-metallic tubing and rigid non-metallic conduit shall not be used within the building.

2.02 CONDUIT FITTINGS

A. Rigid Conduit Fittings:

Threaded, galvanized malleable iron or heavy steel, water and concrete tight. Grounding type nylon insulated bushings for connectors at cabinets, boxes and gutters.

- B. Metallic Tubing Fittings: Set screw type steel, except in wet or concrete tight applications. For wet or concrete tight applications, use compression type galvanized steel. Use connectors with nylon insulated throats at cabinets, boxes and gutters. Indenter type and malleable iron fittings will not be allowed.
- C. Flexible Metal Conduit Fittings: Squeeze or screw type galvanized steel with nylon insulated throats.
- D. Liquidtight Flexible Conduit Fittings: Galvanized steel, with watertight gaskets, O-ring and retainer, and nylon insulated throats.
- E. Conduit Fittings: Exposed conduit fittings shall be Condulet type for sharp turns, tees, etc.

2.03 OUTLET BOXES

- A. Material, size and installation for outlet boxes shall comply with NEC. Article 370.
- B. Boxes shall be Raco, Steel City, Appleton or equivalent. In general, the type of boxes shall be as follows:
 - 1. In stud walls; For single outlet use 4 inches square by 2-1/8 inches deep box. For ganged outlets use 4-1/2 inches high by 1-5/8 inches deep multiple gang boxes. Boxes to be provide with raised covers of depth as required for thickness of wall materials.
 - 2. In masonry and poured concrete walls; For single outlets requiring two conduit connections in top and/or bottom of box use 4 inches square by 2-1/8 inches deep box with raised square cut cover. For ganged outlets use 3-3/4 inches high by 2-1/2 inches deep multiple gang masonry box.

- 3. Surface-mounted wall outlets; For single outlet use 2-1/8 inches deep handy box, for double outlets use 4 inches square by 2-1/8 inches deep box. For more than two ganged outlets use 3-3/4 inches x 2-1/2 inches deep multiple gang masonry boxes. Boxes to be provided with 1/2 inch raised cover as required for device.
- 4. In suspended ceilings; Use 3-1/2 inches deep octagon box with fixture studs and steel mounting bars.
- 5. Surface outlets installed outdoors or in wet locations; Use Type FS or FD box with weatherproof cover plates for receptacles and switches.

2.04 PULL AND JUNCTION BOXES

- A. Construction, sizes and installation of pull and junction boxes shall comply with NEC, Article 370 and tables 270-6 (a) and (b).
- B. Pull and junction boxes not specifically described in NEC, Article 370, shall be fabricated of heavy gauge galvanized steel with screw covers and enamel finish.
- C. Pull and junction boxes for installation in poured concrete floors shall be flush type, cast iron, with watertight gasketed covers. Boxes for installation in floors with tile or carpet floor covering shall have recessed brass covers and brass carpet flanges to accommodate the floor covering.
- D. Pull and junction boxes for outdoor installations shall be raintight.

2.05 AUXILIARY GUTTERS

A. Construction, sizes and installation of auxiliary gutters shall comply with NEC, Article 374.

2.06 HANGERS AND SUPPORTS

- A. Provide conduit hanger and support devices of approved type for method of supporting required, to include: structural steel members, suspension rods, conduit clamps, concrete inserts, expansion shields, beam clamps and welding pins. All devices shall have galvanized finish or other approved corrosion resistance finish. All supporting devices shall be manufactured for the purpose. Hangar wire and similar supports shall not be used. In general, hangers and supports shall be as follows:
 - 1. Where single or multiple run of conduit is routed on surface of structure; use conduit clamps mounted on Unistrut channel so as to maintain not less than 1 inch clearance between conduit and structure.
 - 2. Where single run of conduit is suspended from overhead; use split ring conduit clamp suspended by steel drop rod not less than 3/8 inch diameter.
 - 3. Where multiple parallel runs of conduit are suspended from overhead; use split ring conduit clamps uniformly spaced and supported on trapeze hangers fabricated of Unistrut channels, suspended by not less than 1/2 inch steel drop rod.
 - 4. Where conduit is routed in steel stud partitions, use metal stud clips, style as appropriate for application, equivalent to "Caddy" brand.
 - 5. Maximum hanger and support spacing shall be in accordance with NEC. Regardless of listed spacing, provide additional hangers or supports at not more than 2'-0" from each change of direction and at each side of any box or fitting.
- B. Hangers and supports shall be anchored to structure as follows:
 - 1. Hangers and supports anchored to poured concrete; use malleable iron or steel concrete inserts attached to concrete forms.
 - 2. Hangers or supports anchored to structural steel; use beam clamps and/or steel channels as required by structural system.
 - 3. Hangers or supports anchored to metal deck; use spring clips or approved welding pins. Maximum permissible load on each hanger shall not exceed 50 pound.

4. The use of explosive force hammer actuated, booster assist or similar anchoring device will not be permitted.

PART 3 - EXECUTION

3.01 CONDUIT INSTALLATION

- A. In general, horizontal runs of conduit shall be installed in ceiling spaces. Conduit for convenience outlets, wall-mounted fixtures and other wall outlets shall be routed overhead and dropped through block cells or stud walls to the outlet. Conduit shall not be installed in or below concrete floor slabs except where noted on drawings or required to serve open floor area outlets or equipment.
- B. Generally, conduit shall be concealed, except in shafts, mechanical equipment rooms, and at connections to surface boxes and free standing equipment, and as otherwise noted.
- C. All conduit shall be routed in lines parallel to building lines.
- D. No conduit shall be installed closer than 6 inches to piping installed by other trades.
- E. Minimum size conduit shall be 1/2 inch trade size. Where specific size is not called for on Drawings or in specification, Contractor shall select size required from Chapter 9 of NEC. Where specific sizes required by Drawings or Specifications are larger than Code requires, the larger size shall be installed.
- F. Install the conduit system mechanically and electrically, continuous from outlet and to cabinets, junction or pull boxes, Conduit shall enter and be secured to cabinets and boxes in such a manner that all parts of the system will have electrical continuity.
- G. Install insulated ground wire in all raceways. Size per NEC 250.

3.02 OUTLET BOX INSTALLATION

- A. Outlet boxes shall be installed for, but not limited to, fixtures, switches, receptacles and other devices.
- B. Approximate location of outlets are shown on the plans, but each location as shown shall be checked by the Contractor before installing the outlet box.
- C. Wall boxes installed flush in common wall shall generally not be back-to-back or through-wall types. Where it is necessary to install boxes back-to-back, install sound absorption material between boxes and plug nipple connection with duct seal.
- D. Boxes located on opposite sides of a common wall that are closely connected by conduit shall have the conduit openings plugged with duct seal.
- E. Outlet boxes shall be installed plumb and square with wall face and with front of box or cover located within 1/8 inch of face of finish wall. Boxes in masonry shall be set with bottom or top of box tight to the masonry unit, unless otherwise specifed.

3.03 PULL AND JUNCTION BOX AND GUTTER INSTALLATION

A. Install pull boxes, junction boxes and auxiliary wiring gutters where required by Code and where required to facilitate installation of the wiring. In longer conduit runs, install a pull box for at least each 100 feet of conduit.

- B. For concealed conduit, install boxes flush with ceiling or wall, with covers accessible and easily removable. Where flush boxes are installed in finished ceilings or walls, provide cover which shall exceed the box face dimensions by a sufficient amount to allow no gap between box and finished material.
- C. Boxes shall not be located in finished, occupied rooms, without prior approval of Architect/Engineer.
- 3.04 HANGER SUPPORT INSTALLATION
 - A. Hangers and supports shall be installed for all conduit and boxes. Supports shall be manufactured for the purpose.
 - B. Conduit and boxes shall not be attached to or supported from mechanical pipes, plumbing pipes or sheet metal ducts.
 - C. Tie wire shall not be used.
 - D. Work includes support frames for conduit runs to equipment.

SECTION 16120 - WIRE AND CABLE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The other Contract Documents complement the requirements of this Section. The General Conditions apply to the work of this Section.

1.02 SCOPE

A. Furnish materials, tools, labor and supervision necessary to install wiring systems.

1.03 STANDARDS AND CODES

- A. Methods of installation shall comply with the provisions of applicable Sections of NEC, Article 300.
- B. Materials shall be in accordance with NEC, Article 310 and shall be UL listed for application intended.

1.04 DESCRIPTION

- A. This Section describes the basic materials and methods of installation for general wiring systems of 600 volts and less. Wiring for a higher voltage rating, if required, shall be specified in another Section or as required.
- B. Minimum size conductors shall be No. 12 AWG for power circuits, No. 14 AWG for control wiring and 20 AWG shielded for communication and sensor wiring.

1.05 QUALIFICATIONS

A. The material used for the wiring systems shall be the products of a manufacturer regularly engaged in the manufacturing of the specified material. Where a manufacturer is names for a particular material, the materials of other manufacturers will be acceptable provided the material meets requirement of the specifications.

PART 2 - PRODUCTS

2.01 WIRE AND CABLE

- A. Wire and cable for power, control and signal circuits shall have copper conductors of not less than 98% conductivity and shall be insulated to 600V except as noted below. Power conductor sizes No. 10 and 12 AWG shall be solid or stranded. Aluminum wire is not permitted.
- B. Type of wire and cable for the various application shall be as follows:
 - 1. Type THW, THWN or XHHW (75°C): Use for branch circuits, and equipment power feeders in wet and dry locations, No. 12 AWG minimum.
 - 2. Type RHH, THHN or XHHW (90°C): Use for branch circuits, and equipment power feeders in dry locations only, No. 12 AWG minimum.

2.02 CONDUCTOR COLOR CODING

A. Wiring systems shall be color coded. Conductor insulation shall be colored in sizes up through No. 8 AWG, conductors No. 6 AWG and larger shall have black insulation and shall be phase color coded with one-half inch band of colored tape at all junctions and terminations. Colors shall be assigned to each conductor as described below and carried throughout all main and branch circuit distribution.

<u>CONDUCTOR</u>	120/208 Volt
1. Phase "A" conductor	Black
2. Phase "B" conductor	Red
Phase "C" conductor	Blue
4. Neutral conductor	White
5. Grounding conductor	Green

2.03 CONNECTORS - POWER WIRING

- A. In-line splices and taps for conductor sizes No. 8 AWG and smaller; use 3M Co. Scotchloc vinyl insulated spring connectors, or equivalent.
- B. Insulate splices and taps to thickness of conductor insulation with half-lapped of 3M Scotch brand No.
 33 vinyl electrical tape. Connectors having irregular surfaces; fill voids and smooth contours with 3M Scotchfil electrical putty prior to tapping.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Wire shall not be installed in the conduit system until the building is enclosed and wet work completed.
- B. Conduit shall be swabbed free of moisture and debris prior to pulling in wire.

3.02 INSTALLATION

- A. Splices in branch circuit wires shall be made only in accessible junction boxes.
- B. Power cable shall be pulled with the use of approved pulling compound for long runs.

SECTION 16164 - BRANCH CIRCUIT PANELBOARDS CIRCUIT BREAKER TYPE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The other Contract Documents complement the requirements of this Section. The General Requirements apply to the work of the Section.
- 1.02 <u>SCOPE</u>
 - A. Furnish equipment, materials, tools, labor and supervision necessary to install Branch Circuit Panelboards.

1.03 STANDARDS AND CODES

A. Fabrication and installation shall comply with applicable Section of NEC, Article 384, and shall bear UL label.

1.04 DESCRIPTION

A. Panelboards described in this Section shall be deadfront, safety type furnished with thermal-magnetic molded case circuit breakers. Shall be for lighting, receptacle and appliance branch circuit application. Circuit breakers shall have frame and trip ratings as shown on the Drawings.

1.05 QUALIFICATIONS

A. Panelboards by Square D, Westinghouse, General Electric or Siemens/ITE.

1.06 SUBMITTALS

A. Shop drawings to include fabrication details, lug and bus arrangement, ampere and voltage rating, breaker frame sizes and interrupting ratings.

PART 2 - PRODUCTS

2.01 PANELBOARDS

- A. Bussing Assembly and Temperature Rise:
 - Panelboard bus structure and main lugs or main breaker shall have current ratings as shown on the panelboard schedule. Such ratings shall be established by heat rise tests with maximum hot spot temperature on any connector to bus bar not to exceed 50°C rise above ambient. Heat rise test shall be conducted in accordance with Underwriter's Laboratories Standard UL67. The use of conductor dimensions will not be accepted in lieu of actual heat tests.
 - 2. Bus bar connections to the branch circuit breakers shall be the "distributed phase" or "phase sequence" type.
 - 3. Single-phase, three-wire panelboard bussing shall be such that any two adjacent single-pole breakers can be installed in any location.
 - 4. Three-phase, four-wire bussing shall be such that any three adjacent single-pole breakers are individually connected to each of the three different phases in such a manner that two of the three-pole breakers can be installed at any location.
 - 5. Current-carrying parts of the bus assembly shall be plated. Mains ratings shall be as shown in the panelboard scheduled on the plans.
 - 6. Equipment ground bus shall be provided for all panels.
 - 7. All bussing and Panelboards shall be copper.
- B. Safety Barriers:
 - 1. The panelboard interior assembly shall be dead front with panelboard front removed.

BRANCH CIRCUIT PANELBOARDS CIRCUIT BREAKER TYPE

C. Cabinets and Fronts:

- 1. Panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be as specified in UL Standard 50 for cabinets. Wiring gutters shall be in accordance with UL Standard 67 for panelboards. Minimum gutter 6 inches each side, 5 inches top and bottom.
- 2. Fronts shall include doors and have flush, brushed stainless steel, cylinder tumbler-type locks with catches and spring-loaded door pulls. The flush lock shall not protrude beyond the front of the door. All panelboard locks shall be keyed alike.
- 3. Front shall have adjustable indicating trim clamps which shall be completely concealed when the doors are closed. Doors shall be mounted by completely concealed steel hinges. Fronts shall not be removable with door in the locked position.
- 4. A circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door. The directory card shall provide a space of at least 1/4 inch high x 3 inches long or equivalent for each circuit. The directory shall be typed to identify the load fed by each circuit.
- 5. Fronts shall be of code gauge, full finished steel with rust-inhibiting primer and baked enamel finish.
- 6. Provide surface or flush fronts as needed.
- D. Wiring Terminals:
 - 1. Terminals for feeder conductors to the panelboard mains and neutral shall be UL listed as suitable for the type of conductor specified.
 - 2. Terminals for branch circuit wiring, both breaker and neutral, shall be UL listed as suitable for the type of conductor specified.
- E. Circuit Breakers:
 - 1. Quick-make, quick-break, thermal- magnetic, trip indicating, and have common trip on all multiple breakers.
 - 2. Bolt-on type equipped with individually insulated, braced and protected connectors. The front faces of circuit breakers shall be flush with each other.
 - 3. Large permanent individual circuit numbers shall be affixed to each breaker in a uniform position (or equip each breaker with a circuit card holder and neatly printed card identifying with circuit).
 - 4. Tripped indication shall be clearly shown by the breaker handle taking a position between ON and OFF.
 - 5. Provisions for additional breakers shall be such that no additional connectors will be required to add breakers.
 - 6. At contractors option: Provide multipole circuit breakers where neutral sharing is allowed. All ungrounded circuits sharing neutral conductor shall have multipole breakers whether shown or not.
- F. Special Breakers:
 - 1. Ground Fault Interrupting (GFI), with test button.
 - 2. Shunt Trip, with solenoid plunger to activate the mechanical trip release when activated by low voltage control.

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G. Integrated Equipment Rating:

1. Each panelboard, as complete unit, shall have a rating equal to or greater than the integrated equipment rating shown on the panelboard schedule. Such rating shall be established by test with the circuit breakers mounted on the panelboard. The short-circuit tests on the circuit breaker shall be made simultaneously by connecting the fault to each panelboard breaker with the panelboard connected to its rated voltage source. Method of testing shall be per proposed UL standards pertaining to listing of molded case circuit breakers for high-interrupting capacity ratings. The source shall be capable of supplying the specified panelboard short-circuit current or greater. Test data showing the completion of such tests upon the entire range of distribution and power panelboards to be furnished shall be submitted to the Architect, if requested, with or before the submittal of approval drawings. Testing of panelboard circuit breakers for short-circuit rating only with a breaker individually mounted is not acceptable. Also testing of the bus structure by applying a fixed fault to the bus structure alone is not acceptable.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Secure anchor panelboards to structure and make feeder and branch circuit connections as required. Provide unistrut as required to mount panel to structure.
- B. Provide GFI breakers for circuit in lieu of individual 120v outlet GFI devices
- C. Provide Shunt Trip breakers as required by state or local codes serving all cooking equipment located under kitchen cookline exhaust hood. Connect external control to the Ansul fire protection system at the cookline hood for automatic de-energizing of all power to equipment.

SECTION 16170 - DISCONNECT SWITCHES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The other Contract Documents complement the requirement of this Section. The General Requirements apply to the work of this Section.

1.02 <u>SCOPE</u>

- A. In general, disconnect switches are indicated on the Drawings, and it shall be the Contractor's responsibility to furnish and install all disconnect switches, whether indicated or not, for equipment and motors furnished.
- B. Disconnect switches shall be fused unless otherwise noted. Fuse per nameplate.

1.03 STANDARDS AND CODES

- A. Except where otherwise required by this Section, the following Standards and Codes shall govern:
 - 1. NEC Article 380
 - 2. UL listed
 - 3. NEMA KSI 1969

1.04 QUALIFICATIONS

A. Disconnect switches by Square D, Siemens/ITE, General Electric or Cutler-Hammer.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Disconnects for fractional horsepower motors, 1/2-horsepower and smaller, and less than 125 volts, and for equipment of similar capacity and voltage shall be supplied integral with the equipment or shall be a standard snap switch horsepower rated.
- B. Disconnects for fractional horsepower motors larger than 1/2-horsepower and for integral horsepower motors, and for equipment of similar capacity shall be general duty industrial type, with solid neutrals when required.

SECTION 16199 - WIRING DEVICES AND PLATES

PART 1 - GENERAL

- 1.01 RELATED DOCUMENTS
 - A. The other Contract Documents complement the requirement of this Section. The General Requirements apply to the work of this Section.
 - B. See Section 16950-Occupancy Sensors for wall switch sensors.

1.02 <u>SCOPE</u>

Α.

Α.

A. Provide materials, equipment, labor and supervision necessary to install Wiring Devices.

1.03 STANDARDS AND CODES

- Except where otherwise required by this Section, the following Standards and Codes shall govern:
 - 1. Receptacles; NEC Article 410K
 - 2. Wall Switches; NEC Article 380
 - 3. UL listed
 - 4. NEMA Standards

1.04 QUALIFICATIONS

- Provide products, as approved by the Architect, from one of the following manufacturers:
 - 1. "Hubbell".
 - 2. "General Electric".
 - 3. "Legrand/Pass & Seymour".
 - 4. "Lutron".
 - 5. "Leviton".
 - 6. "Arrow Hart".

PART 2 - PRODUCTS

2.01 <u>GENERAL</u>

A. All wiring devices shall be "Specification Grade" except where higher grade is called for.

2.02 <u>SWITCHES</u>

- A. Switches shall be:
 - 1. Single Pole Toggle Light Switch 20 amp, 120-277 volt, "Hubbell" No. 1221, "Hubbell" No. 1221-L for lock type.
 - 2. Double Pole Toggle Light Switch 20 amp, 120-277 volt, "Hubbell" No. 1222, "Hubbell" No. 1222- L for lock type.
 - 3. Three-Way Toggle Light Switch 20 amp, 120-277 volt, "Hubbell" No. 1223, "Hubbell" No. 1223- L for lock type.
 - 4. Single pole-double-throw center off light switch 15 amp, 120-277 volt, "Hubbell" No. 1381.
 - 5. Momentary Contact Switch 15 amp, 120-277 volt, "Hubbell" No. 1556, "Hubbell" No. 1556-L for lock type.
 - Pilot Light Press Switch 20 amp, 120-277 volt, Single Pole "Hubbell" No. 1297-I, Double Pole "Hubbell" No. NY 1514-I, Three-Way "Hubbell" No. 1298-I.
 - 7. Color: White.

2.03 <u>RECEPTACLES</u>

A. Receptacles shall be:

- 1. Duplex Receptacle 2 pole, 3 wire grounding type, back and side wired, 20 amp, 125 volt, "Hubbell" No. 5362.
- 2. Receptacles for power and special purpose outlets shall have characteristics and NEMA configurations as per Electrical Symbols list. Supply as needed.
- 3. Color: White.

2.04 <u>COVER PLATES</u>

- A. High impact resistant smooth thermalplastic. Color: White.
- B. Provide plates for all switches, receptacles, and outlets throughout the entire project. Provide blank plates for all unused outlets.
- C. Plates for outlets in unfinished spaces shall be of the handy box type.

2.05 EXTERIOR RECEPTACLE COVERS

- A. Provide weatherproof "While-In-Use" covers for all exterior receptacles per NEC, Section 406.8(B)(1) for Outdoor Wet Location covers, equal to "Legrand/Pass&Seymour" WIU Series.
- B. Color to be selected from manufacturer's entire selection.

2.06 GROUND FAULT INTERRUPTING RECEPTACLES (GFI)

A. Ground fault interrupting receptacles shall be duplex feed through type with test and reset buttons, equal to "Legrand/Pass&Seymour" No. 1591F.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Wiring devices shall be installed and located as follows, unless noted otherwise on the Drawings:
 - 1. Switches: 44 inches above finished floors.
 - 2. Receptacles: 16 inches above finished floors typically; 44 inches above finished floors or 8 inches above countertops; 48 inches above finished floors in shops, mechanical rooms, utility rooms, service spaces, and similar areas where required by the NEC.
 - 3. Dimensions are to bottom of outlet box.
- B. In masonry walls, switches and receptacle heights shall be adjusted as required so outlets are at nearest mortar joint to specified height.
- C. Where light switches are located adjacent to doors, they shall be installed on knob side of door, unless indicated otherwise.
- D. Where walls have wainscot finish, switch height shall be adjusted as required, so switch is either all in wainscot or all in wall above wainscot.
- E. Prior to roughing-in outlet boxes, Contractor shall verify from general construction drawings; door swings, type of wall finishes and locations for counters and work benches.

SECTION 16450 - GROUNDING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The other Contract Document complement the requirements of this Section. The General Conditions apply to the work of this Section.

1.02 <u>SCOPE</u>

A. This section deals with the grounding of service equipment, transformers, non-current carrying conductive surfaces of equipment, metal buildings, structures and other equipment.

1.03 STANDARDS AND CODES

- A. All grounding connections shall be installed in accordance with the National Electrical Code and applicable local code requirements. Such codes shall be considered minimum requirements and the installation of the grounding system shall insure freedom from dangerous shock exposure and shall provide a low impedance ground fault path to permit operation of overcurrent and ground fault protective devices.
 - 1. NEC Article 250
 - 2. National Electrical Safety Code.

1.04 QUALIFICATIONS

A. Use Thomas and Betts compression ground system, exothermic welds or an approved listed compression type system.

PART 2 - PRODUCTS

2.01 <u>CONDUCTORS</u>

A. All grounding conductors whether insulated or not shall be copper.

2.02 GROUND RODS

A. All ground rods shall be copper clad steel, 3/4 inch by 10 feet solid type.

2.03 GROUND CONNECTIONS

- A. The connection of a grounding conductor to ground rods or ground conductor to ground conductor shall be by means of Thomas & Betts compression ground system, or exothermic weld.
- B. Ground connections to building steel or equipment shall be bolted using T & B compression type lugs.
- C. Slab penetrations of ground conductors shall terminate on T & B compression type flush plate connectors installed flush in slab. Interior connections of flush plate connectors shall be made using compression lugs.
- D. Grounding conductor connections at conduit terminations shall be made by approved listed grounding bushings.

PART 3 - EXECUTION

3.01 MAIN SERVICE GROUND

A. In accordance with NEC Article 250-81, each of the following shall be bonded together to form the grounding electrode system:

GROUNDINGS

- 1. Metal underground water pipe in direct contact with the earth for 10 feet or more (provide jumpers around water meter).
- 2. Metal frame of the building where effectively grounded.
- 3. Concrete-encased electrode consisting of a minimum of 20 feet of No. 3/0 AWG bare copper in the footing.
- 4. Counterpoise (Ground Ring) for lightning protection system (if lighting protection is installed).
- B. This grounding system shall be supplemented by three copper clad steel ground rods 3/4 inches in diameter by 10 feet long. The ground rods shall be driven a distance of 10 feet apart.
- C. The grounding electrode system shall be connected to the grounded circuit conductor (neutral) on the supply side of the service disconnecting means by a grounding electrode conductor. The grounding electrode conductor will be sized as shown in Table 250-94 of the National Electrical Code.

3.02 FEEDER AND BRANCH CIRCUITS

A. All feeders and branch circuits shall have installed in the same raceway as the circuit conductors, an insulated copper grounding conductor sized in accordance with Table 250-95 of the National Electrical Code unless such a grounding conductor is shown to be larger on the plans or specified to be larger elsewhere in the specifications.

3.03 EXPOSED NON-CURRENT CARRYING CONDUCTIVE SURFACES

A. All exposed non-current carrying conductive surfaces of electrical equipment shall be grounded to the equipment conductor run with the circuit conductors or a separate ground as shown on the drawings.

SECTION 16471 - FEEDER AND BRANCH CIRCUITS

PART 1 - GENERAL

- 1.01 RELATED DOCUMENTS
 - A. The other Contract Documents complement the requirements of this Section. The General Conditions apply to the work of this Section.

1.02 <u>SCOPE</u>

- A. Provide materials, equipment, labor and supervision necessary to install feeder and branch circuits to include, but not limited to:
 - 1. Conductors
 - 2. Conduit fittings and boxes
 - 3. Overcurrent protection
 - 4. Panelboards
 - 5. Conduit hangers and supports
 - 6. Wiring devices
 - 7. Motor and equipment connections

1.03 STANDARDS AND CODES

- A. Except where otherwise required by this Section, the following Standards and Codes shall govern:
 - 1. Branch circuits: NEC Articles 210 and 220
 - 2. Feeders; NEC Articles 215 and 220
 - 3. Motor circuits; NEC Article 430
 - 4. Grounding; NEC Article 250

PART 2 - PRODUCTS

2.01 FEEDER CIRCUITS

- A. A riser diagram and general layout of feeder circuits are indicated on the drawings. The Contractor shall lay out the feeders generally as indicated, but shall determine the exact layout and routing of feeders so as to best fit the layout of the work.
- B. Conductor sizes for feeder circuits are noted on the drawings or panel schedules.

2.02 BRANCH CIRCUITS

- A. A general layout of branch circuit wiring is indicated on the drawings. Receptacles and appliances shall be on separate circuit from lighting.
- B. Branch panel circuits are numbered to match NEMA pole numbering system; poles 1 and 2 Phase A, poles 3 and 4 Phase B, poles 5 and 6 Phase C, etc.
- C. No. 14 wire will be permitted only on control circuits of relays, contractors, starters, etc. No. 12 wire will be minimum size for any lighting, motor or general branch circuits unless specifically noted otherwise.
- D. Conductor sizes for major branch circuits, such as large motor and equipment branch circuits, are noted on the drawings.
- E. Conductor sizes for lighting, receptacles and small motor branch circuits, with less than 20 ampere connected load, are not shown on drawings. Conductors for such circuits shall be sized as follows:

- 1. Conductor size for branch circuits 100 feet in length from branch circuit panel to center of load shall not be smaller than No. 12; over 100 feet not smaller than No. 10.
- 2. Conductor size for exit light circuits shall not be smaller than No. 10.
- F. Where specific conductor sizes required by the drawings are larger than Code required, the larger sizes shall be installed.
- G. Circuits may be arranged in 4-wire feed, 3 circuits and common neutral, in color code previously described, more than 3 circuits in conduit is not permitted.

SECTION 16500 - LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The other Contract Documents complement the requirements of this Section. The General Requirements apply to the work of this Section.

1.02 <u>SCOPE</u>

Α.

A. Provide lighting fixtures, accessories, labor, and supervision necessary to install a complete Lighting System.

1.03 STANDARDS AND CODES

- Except where otherwise required by this Section, the following Standards and Codes shall govern:
 - 1. NEC Article 410.
 - 2. UL listed.

1.04 <u>SUBMITTALS</u>

A. Submit catalog cuts giving complete description of fixtures to include photometric curves and method of installation.

1.05 QUALIFICATION

- A. The lighting fixtures listed in the fixture schedule are the basis for design. Includes both aesthetic and performance requirements.
- B. Requests for approval for substitutions must be submitted per Section 01630, complete with all supporting data and product information.
- C. Final review for fixtures will be when shop drawings are submitted. The Architect reserves the right to reject and fixtures which, in his opinion, do not meet the overall lighting system design. Upon request, the fixture supplier shall submit sample fixtures.

PART 2 - PRODUCTS

2.01 FIXTURES

- A. Provide fixtures as indicated on drawings.
- B. Recessed fixtures in soffits and solid surface ceilings shall be furnished with trim kits and supports compatible with construction.
- C. See Electrical Drawings and Lighting Fixture Schedule for additional requirements of all fixtures.

2.02 LED FIXTURES

- A. LED Lamps shall have system life rated to retain a minimum of 70% light output at 50,000 hours of use (L70 at 50,000 hours).
- B. LED lamp color temperatures shall be rated at CRI > 80.
- C. If lumens are indicated on fixture schedule, it is the minimum delivered lumens of output required.
- D. If fixture watts are indicated on fixture schedule, it is the maximum nominal input wattage permitted.

E. Provide adapters as required for depths of construction at each location and condition. Provide correct trim and mounting as required for each location and condition.

2.03 FLUORESCENT FIXTURES

- Fluorescent fixture housings shall be die-formed of cold rolled steel of not less than 20 gauge.
 Construction shall provide an approved method of locking lens or shielding in place. Enamel finish for light reflectance shall have a hardness between H and 3H. Before enamel is applied, the metal shall be cleaned and prepared by "Bonderizing" or an equivalent process.
- B. Plastic lenses for fluorescent fixtures shall be 100% virgin acrylic, not less than 1/8 inch nominal thickness.
- C. Temperature around ballast and in fixture housing shall not exceed 90°C with ambient room temperature of 27°C.
- D. Fluorescent ballast shall be energy saving electronic type by General Electric, Universal or Advance, thermal protected non-resetting, HPF, CBM, ETL.
- E. Recessed fixtures in plaster ceilings shall be furnished with plaster frames.
- F. Prior to placing orders for recessed fluorescent fixtures, Contractor shall verify the types of ceilings and suspension systems that have been approved for the project and shall order fixtures with flanges and supports as required to fit in the approved ceilings.

2.04 INCANDESCENT FIXTURES

A. Recessed fixtures shall be furnished with gaskets, so designed and installed that they will completely eliminate light leakage between flanges and ceilings.

2.05 LAMPS

- A. Provide lamps from one of the following manufacturers:
 - 1. General Electric.
 - 2. Westinghouse.
 - 3. Phillips.
 - 4. Sylvania.
- B. Furnish lamps for all fixtures as per schedule on drawings.
- C. Fluorescent lamps to be rapid start T-8, 3500°K min.
 - 1. 34 watt (2,750 lumen) F40 430ma.
 - 2. 25 watt (2,000 lumen) F30 430ma.
 - 3. 55 watt (4,000 lumen) F48 800ma high output.
 - 4. 85 watt (8,300 lumen) F96 800ma high output.
- D. Incandescent lamps to be 130 volt, extended service.
- E. High intensity discharge lamps shall be of the following types, wattages, and base style as indicated in lighting fixture schedule and as follows:
 - 1. Mercury Vapor (MV) coated deluxe white.
 - 2. Metal halide (MH) phosphor coated.
 - 3. High Pressure Sodium (HPS) diffused.
 - 4. Provide quartz restrike lamps for all interior high intensity discharge lights where indicated on

Drawings.

F. Provide lenses in recessed fixtures, as required by code, whether scheduled or not.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fixtures; coordinate exact location with Architect's Drawings.
- B. Fixtures shall be grounded.
 Lamp sockets shall be wired so that the outer shell is connected to the neutral grounded conductor.
- C. Recessed fixtures in removable ceilings shall be connected to the branch circuit with flexible conduit and branch circuit wire from an accessible junction box. Fluorescent fixtures shall not be used for branch circuits feed-through.
- D. Fixtures recessed in furred ceiling shall be installed so that they can be removed from below the ceiling.
- E. Fixtures installed in plastered or solid ceilings shall not be supported directly from the ceiling. Support fixtures from metal bar hangers, stud framing, or Unistrut channels attached to the structure.
- F. Fixtures installed in acoustical lay-in ceilings shall not be supported directly from ceiling or grid. Support fixtures from metal bar hangers, rods, or cables attached to the structure. Install supports per requirements of the NEC, IBC, and local authorities, but never less than two opposing corners.
- G. Provide unwitched "hot" conductor from same circuit serving lighting in that area to provide continuous power to nightlight emergency lighting and exit lighting, whether shown or not.
- H. Make final connections between fixtures and wiring system.
- I. Replace any lamps which do not operate properly, or which have been used for temporary lighting.

SECTION 16510 - EXTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The other Contract Documents complement the requirements of this Section. The General Requirements apply to the work of this Section.
- 1.02 <u>SCOPE</u>
 - A. Provide lighting fixtures, accessories, labor and supervision necessary to install a complete Exterior Lighting System.

1.03 STANDARDS AND CODES

- A. Except where otherwise required by this Section, the following Standards and Codes shall govern:
 - 1. NEC Article 410
 - 2. UL listed.

1.04 <u>SUBMITTALS</u>

A. Submit catalog cuts giving complete description of fixtures to include photometric curves and method of installation.

1.05 QUALIFICATION

- A. The lighting fixtures listed in the fixture schedule are the basis for design. Requests for approval of substitutions with complete supporting data must be submitted per Section 01630.
- B. Final review for fixtures will be when shop drawings are submitted. The Architect reserves the right to reject any fixtures which, in his opinion, do not meet the overall lighting system design. Upon request, the fixture supplier shall submit sample fixtures.

PART 2 - PRODUCTS

2.01 FIXTURES

- A. Provide fixtures as indicated on drawings.
- B. Recessed fixtures in soffits shall be furnished with trim kits and supports compatible with soffit construction.

2.02 LAMPS

- A. Lamps shall be General Electric, Westinghouse, Phillips, or Sylvania.
- B. Furnish lamps for all fixtures as per schedule on drawings.
- C. High intensity discharge lamps shall be of the types, wattages and base style as indicated in lighting fixture schedule on electrical plans.
- D. Provide fresnel lenses in recessed fixtures, as required by code.

2.03 LED FIXTURES

- A. LED Lamps shall have system life rated to retain a minimum of 70% light output at 50,000 hours of use (L70 at 50,000 hours).
- B. LED lamp color temperatures shall be rated at CRI > 80.
- C. If lumens are indicated on fixture schedule, it is the minimum delivered lumens of output required.
- D. If fixture watts are indicated on fixture schedule, it is the maximum nominal input wattage permitted.
- E. Provide adapters as required for depths of construction at each location and condition. Provide correct trim and mounting as required for each location and condition.
- F. See Electrical Drawings and Lighting Fixture Schedule for additional requirements of LED fixtures.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install fixtures; coordinate exact location with Architect's plan.
- B. Fixtures shall be grounded. Lamp sockets shall be wired so that the outer shell is connected to the neutral grounded conductor.
- C. Make final connections between fixtures and underground wiring system.
- D. Replace any lamps which do not operate properly, or which have been used for temporary lighting.

SECTION 16610 - ELECTRICAL HEATERS

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Furnish labor, materials, equipment, special tools, supervision and services required for installation of electric heaters.
 - B. Electric heaters are as indicated or scheduled on the drawings.

1.02 SUBMITTALS

- A. Product Data: Indicate unit operation, characteristics, wiring diagrams, power requirements, configuration and finish for each type of unit specified.
- 1.03 QUALITY ASSURANCE

A. Assembly: UL listed and labeled, with thermal box and cover and built-in controls.

1.04DELIVERY, STORAGE AND HANDLINGA.Do not install before building is weathertight.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Provide products, as approved by the Architect, from one of the following acceptable manufacturers:
 - 1. "Dayton"
 - 2. "Q-Mark"
 - 3. "Markel"
 - 4. "Chromalox"
 - 5. "Brasch"

PART 3 - EXECUTION

- 3.01 INSTALLATION
 - A. Install in accordance with manufacturer's published installation instructions and as required by NEC Article 424.

SECTION 16660 - WIRING FOR EQUIPMENT

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The other Contract Documents complement the requirements of this Section. The General Requirements apply to the work of this Section.

1.02 <u>SCOPE</u>

- A. Provide materials, labor and supervision necessary to install electric services for all equipment.
- B. In general, the equipment to be wired shall include but not limit to the following:
 - 1. Mechanical Equipment
 - 2. Equipment furnished by Owner.
 - 3. Other equipment as required.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Provide services and make final connections for motors and equipment. Make final connections except where notes on drawings state "rough-in only". Where final connections are not to be made, install outlet box, pull in conductors and leave an 8 inch pigtail for each conductor. Conductors shall be taped and appropriate cover plate installed over box.
- B. Furnish safety disconnects for motors and equipment as needed, so as to make service complete to each item of equipment.
- C. Prior to roughing-in conduit, the Contractor shall consult with Equipment suppliers, and shall verify with them the exact locations for rough-ins, and the exact size and characteristics of the services required, and shall obtain from the Equipment Suppliers a schedule of electrical loads for the equipment furnished by them. These schedules shall be used for verifying services, motor starters, disconnects, fuses and overload protection.
- D. Changes required in the work, due to the Contractor's failure to comply with these requirements, shall be made by the Contractor at no additional cost to the Owner.

SECTION 16741 - COMPUTER CONDUIT SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The other contract Documents compliment the requirements of this Section. The General Requirements apply to the work of this section.

1.02 <u>SCOPE</u>

- A. Provide materials, equipment, labor and supervision necessary to install conduit system, for installation of Computer service by Computer Vendor.
- B. Provide materials, equipment, labor and supervision necessary to install conduit system, for installation of data service by Data Company, including all exterior service conduits, and conduits at each wall box indicated as a data outlet.
- C. Provide a telephone board (whether shown or not) with one empty 4" PVC conduit underground from telephone board to property line. Install complete per data company requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Computer conduit system shall meet same basic requirements as Section 16111 Conduit Systems.
- B. Computer terminal boards shall be 3/4" thick fire retardant plywood. Paint with two coats of interior enamel.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Consult with Computer Vendor prior to installing the service and conduit system and verify the exact requirements before proceeding with the work.
- B. Install a pull string in each Computer conduit for Computer Vendor's use.
- C. Install blank plates on any unused boxes.
- D. Unless otherwise noted all telephone outlets shall be stuffed to nearest accessible ceiling space with 3/4" conduit with a bushing at both ends.
- E. In the event of a plenum ceiling space, contractor shall install complete, a 3/4" conduit from telephone outlet to telephone board. Conduit shall be compatible with being installed within a plenum space. No "Daisy Chain" outlets allowed.

SECTION 16950 – LIGHTING SENSORS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Furnish labor, materials, equipment, special tools, supervision and services required to provide and complete all lighting sensor work on this Project as indicated, noted, detailed and scheduled on the drawings and specified herein.
- B. Generally includes the following:
 - 1. Ceiling Sensors.
 - 2. Wall Switch Sensors.
 - 3. Wall Sensors.
 - 4. Power Packs.

1.02 <u>RELATED WORK SPECIFIED ELSEWHERE</u> Division 1 - General Requirements Division 15 - Electrical Section 16500 - Lighting

1.03 QUALITY ASSURANCE

- A. All components shall be U.L Listed.
- B. All components shall meet all applicable requirements of the NEC and State and local Codes.
- C. All components shall be supplied by a single manufacturer that has been continuously involved in manufacture of lighting sensors for a minimum of (5) years.
- D. All components shall offer a minimum (5) year warranty.

1.04 <u>SUBMITTALS</u>

- A. Product Data:
 - 1. Manufacturer's published catalog data, cutsheets, literature, specifications and installation instructions.
 - 2. Indicate any load restrictions when used with electronic ballasts.
- B. Shop Drawings:
 - 1. Submit lighting plans indicating all sensor locations, types, orientations, etc.
 - 2. Submit any interconnection diagrams per major subsystem showing proper wiring required.

PART 2 - PRODUCTS

2.01 <u>CEILING SENSORS (DUAL TECHNOLOGY-STANDARD RANGE)</u>

- A. Provide one of the following approved products:
 - 1. "Acuity Brands"; Sensorswitch #CM PDT 10.
 - 2. "Watt Stopper"; #DT-300 Series, Standard Extended Range.
 - 3. "Eaton/Greengate"; #OAC-DT-2000.
- B. Description:
 - 1. Generally intended for use in rooms and areas 1,000 s.f. and larger.

- 2. Shall provide line-of-sight passive infrared (PIR) detection of small motion in a 360 degree circular pattern for detection of mobile occupants within the space and combine overlapping ultrasonic microphonics coverage for detection of occupants within the space either idle or located behind obstructions.
- 3. Low voltage.
- 4. Surface mounted to ceiling.
- 5. Shall not react to noise or ambient sound.
- C. Options:

Α.

- 1. Provide "R" Low Voltage Relay. Only one relay required per zone.
- 2. Provide "D" Occupancy Controlled Dimming for all circuits requiring dimming fixtures. Only one sensor per zone required to have dimming output.
- D. Color of device to be White.

2.02 <u>CEILING SENSORS (DUAL TECHNOLOGY-CORRIDOR COVERAGE)</u>

- Provide one of the following approved products:
- 1. "Acuity Brands"; Sensorswitch #CM PDT 11.
- 2. "Watt Stopper"; #DT-300 Series, Standard Extended Range.
- 3. "Eaton/Greengate"; #OAC-DT-2000.
- B. Description:
 - 1. Generally intended for use in corridors.
 - 2. Shall provide line-of-sight passive infrared (PIR) detection of large motion in a 360 degree circular pattern for detection of mobile occupants within the space and combine overlapping ultrasonic microphonics coverage for detection of occupants within the space either idle or located behind obstructions.
 - 3. Low voltage.
 - 4. Surface mounted to ceiling.
 - 5. Shall not react to noise or ambient sound.
- C. Color of device to be White.

2.03 WALL SWITCH SENSORS (DUAL TECHNOLOGY)

- A. Provide one of the following approved products:
 - 1. "Acuity Brands"; Sensorswitch #WSX PDT Series.
 - 2. "Acuity Brands"; Sensorswitch #WSD PDT Series.
 - 3. "Watt Stopper"; #DW-100 Series.
 - 4. "Eaton/Greengate"; #ONW-D Series.
- B. Description:
 - 1. Shall provide line-of-sight passive infrared (PIR) detection of small motion in a 180 degree semicircular pattern for detection of mobile occupants within the space and combine overlapping ultrasonic microphonics coverage for detection of occupants within the space either idle or located behind obstructions.
 - 2. Capable for either 120 volt or 277 volt power.
 - 3. Wall mounted within standard single-gang electrical box.
 - 4. Shall not react to noise or ambient sound.
 - 5. Field-selectable operation set per Owner's requirements.
 - 6. Manual override buttons for field selectable option to change sensor operation from automatic sensor ON to manual ON.
 - 7. Audible alert for impending shutoff.

LIGHTING SENSORS

- 8. Shall be capable of either Wiring To Neutral or Wiring To Ground (No Neutral).
- 9. Shall be capable of detection at a level 30" a.f.f. up to 300 s.f. and gross motion up to 1,000 s.f.
- C. Color of device and wallplate to be selected from manufacturer's entire selection.

2.04 WALL SWITCH PODS (ON/OFF)

- A. Wall pods shall be:
 - 1. "Acuity Controls" Model sPODM-SA, or equal.
 - 2. Push button On/Off control.
 - 3. Device to fit standard single gang or multi-gang switch boxes.
 - 4. For use with minimum 18AWG wiring.
 - 5. Shall be approved by the lighting manufacturer for use in conjunction with installed lighting fixtures.
 - 6. Color: White.

2.05 <u>SENSORS</u>

- A. General:
 - 1. Shall be capable of operating normally with electronic ballasts, PL lamp systems, LED driver systems, and rated motor loads.
 - 2. Shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
 - 3. Shall have UL rated plastic enclosures.
- B. Operation:
 - 1. Coverage shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioning or heating fans.
 - 2. Shall have readily accessible and user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.
 - 3. In the event of failure, a bypass manual override shall be provided on each sensor. When bypass is utilized, lighting shall remain on constantly or control shall divert to a wall witch until sensor is replaced. This control shall be recessed to prevent tampering.
 - 4. Where indicated or where operation is required as intended, sensor shall have an internal additional isolated relay with Normally Open, Normally Closed, and Common outputs for use with HVAC control, Data Logging, BAS connectivity, Daylight Sensor connectivity, and other control options. Sensors utilizing separate components or specially modified units to achieve this function are not acceptable.

2.06 POWER PACKS

A. Description:

- 1. Self-contained unit consisting internally of an isolated load switching control relay and a transformer to provide low-voltage power.
- 2. Universal voltage type.
- 3. Shall be rated for installation within ceiling plenums.
- 4. Provide units for low temperature or high humidity conditions where applicable.
- 5. Relay contacts shall be rated as follows:
 - a. 13A or 15A Tungsten @120 VAC.
 - b. 20A Ballast @120 VAC.
 - c. 20A Ballast @277 VAC.
 - d. 1HP Motor @120 VAC.
 - e. 2HP Motor @250 VAC.
 - f. Shall be available for 120, 220, 240, 277, and 347 VAC operation.

B. Manufacturer:

- 1. Manufacturer shall determine the appropriate power pack required for sensor or group of sensors, unless specific packs are selected. In that case, the manufacturer shall verify that the selected packs are applicable and most appropriate for intended installation.
- 2. Power packs shall be by the same manufacturer as the sensors, compatible with the sensors selected and provided as a complete and integral system.
- C. Installation:
 - 1. Provide power pack to serve each sensor or group of sensors as required.
 - 2. Install concealed above ceiling or in adjacent room or space.
 - 3. Control wiring between sensors and control units shall be Class II, 18-24 AWG, stranded UL Classified, PVC insulated or Teflon jacketed cable and plenum rated, where applicable.
 - 4. Minimum acceptable wire gauge from the circuit control hardware relays shall be #14 AWG.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations.
- B. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s) for the intended use and occupancy.
- C. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.
- D. It is the contractor's responsibility to arrange a pre-installation meeting with manufacturer's factory authorized representative, at owner's facility, to verify placement of sensors and installation criteria.
- E. The time delay settings for certain applications or rooms may need to be field adjusted up to the 30 minute time delay. Coordinate this work with the Owner, temperature controls contractor, mechanical contractor, electrical contractor or technology contractor where needed (i.e. restroom exhaust fans etc.).
- F. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.
- G. The contractor shall also provide, at the Owner's facility, the training necessary to familiarize the Owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

SUBMITTAL CHECKLIST

- 1. Product Data.
- 2. Shop Drawings.

SECTION 17050 – INTERIOR COMMUNICATION PATHWAYS

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Interior Horizontal and Backbone Cabling Communication Pathways
- B. Pathways include but not limited to:
 - 1. Conduit
 - 2. Innerduct
 - 3. Sleeves
 - 4. Cable Tray
 - 5. Cable Hangers
 - 6. Wireways and Wire Troughs

1.02 RELATED WORK SPECIFIED ELESWHERE

- A. Division 16 Electrical
- B. Section 17120 Backbone Cabling Requirements
- C. Section 17130 Horizontal Cabling Requirements

1.03 QUALITY ASSURANCE

- A. Materials and work specified herein shall comply with the applicable requirements of:
 - 1. National Electric Code (NFPA 70) including the following Articles:
 - a. 318 Cable Trays
 - b. 331 Electrical Nonmetallic tubing
 - c. 348 Electrical metallic tubing
 - d. 349 Flexible metallic conduit
 - e. 350 Flexible metal tubing
 - f. 351 Liquid-Tight Flexible metal conduit and Liquid-Tight flexible nonmetallic conduit.
 - g. 352A Surface Metal Raceways
 - h. 352B Surface Nonmetallic raceways.
 - i. 353 Multioutlet Assembly
 - j. 354 Underfloor raceways
 - k. 362 Metal Wireways and nonmetallic Wireways
 - I. 370 Outlet, Device, Pull and Junction Boxes, Conduit Bodies and Fittings
 - m. 645 Information Technology Equipment
 - n. 770 Optical Fiber Cables and Raceways
 - o. 800 Communications Circuits
 - 2. ANSI-C80.3 Specifications for Electrical Metallic Tubing, Zinc-coated.
 - 3. Telecommunications Industry Association (TIA) standards:
 - a. ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard
 - b. ANSI/TIS/EIA-569-A Commercial Building Standard, Telecommunications Pathway & Spaces
 - c. EIA/TIA-606-A Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
 - d. EIA/TIA-607 Commercial Building Grounding and Bonding requirements for Telecommunications
 - 4. The following BICSI guidelines
 - a. BICSI Telecommunications Distribution Design Manual (11th edition)
 - b. BICSI Customer Owned Outside Plant Design Manual (4th edition)
 - c. BICSI Telecommunications Cabling Installation Manual (5th edition)

5. The following UL Standards.

- a. UL 1, 2000 Flexible Metal Electrical Conduit
- b. UL 3, 1999 Flexible Nonmetallic Tubing for Electric Wiring
- c. UL 5, 1996 Surface Metal Electrical Raceways and Fittings
- d. UL 360, 1996 Liquid-Tight Flexible Steel Conduit, Electrical
- e. UL 514B, 1996 Fittings for Conduit and Outlet Boxes
- f. UL 797, 1997 Electrical Metallic Tubing
- g. UL 870, 1995 Electrical Wireways, Auxiliary Gutters and Associated Fittings.

1.04 <u>SUBMITTALS</u>

- A. Product Data for:
 - 1. Conduit
 - 2. Sleeves
 - 3. Cable Hangers
 - 4. Wireways and Wire Troughs

PART 2 - PRODUCTS

2.01 <u>CONDUIT</u>

- A. Rigid Non-Metallic PVC Conduit:
 - 1. Heavy wall, Schedule 40
 - 2. Rated for use with 90 degree C conductors
 - 3. UL listed for direct burial and concrete encasement
- B. Fittings for Rigid Non-Metallic PVC Conduit
 - 1. Solvent cementing type
 - 2. Insulated throat up to and including 1"
 - 3. Plastic bushing for sizes 1-1/4" and larger
 - 4. Conduit body types, shapes and sizes as required to suit application and NEC requirements.

2.02 INNERDUCT

- A. PVC Riser rated or plenum rated as required.
- B. Size: 1-1/4" diameter
- C. Color: Orange
- D. UL Listing: 2024 Standard

2.03 CABLE HANGERS

- A. Prefabricated, zinc coated, carbon steel, wide base hangers designed specifically for UTP and Optical Fiber cable installations.
- B. Open top, rolled edges and a 2" to 4" minimum diameter loop as required.
- C. Beam clamps, rod fasteners, flange clips and brackets as job conditions require.

PART 3 - EXECUTION

- 3.01 <u>CONDUIT</u>
 - A. Electrical Metallic Tubing, Rigid Metal Conduit and Rigid PVC are allowed conduit. Flexible metal conduit is not allowed.

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- B. Conduit runs to work areas shall service no more than one (1) communication outlet.
- C. Conduits shall be sized to accept 50% future growth; sizing shall account for fire code capacity restrictions.
- D. Identification: Clearly label conduit at exposed ends indicating closet or outlet where conduit terminates.
- E. Fire stop all pathways as previously specified in the Project Manual.
- F. All backbone conduits shall be marked with 1" reflective tape every 25 feet.
- G. Bush all conduit ends not bushed by Division 16.

3.02 CABLE HANGERS

- A. Provide cable hangers a maximum 3 feet center/center wherever cable tray or conduit is not present.
- B. Ceiling ties and rods shall not be used to hang cable or cable supports without Architect approval.
- C. Load hangers per manufacturers recommendations. Provide hangers side by side on a common bracket where cable quantities require.
- D. Do not install cables loose above non-accessible ceilings
- E. Install cables minimum 6 inches above lay-in ceiling tile. Cables shall **not touch** the ceiling.
- F. Do not support cable from ceiling system tie wires or grid in fire rated systems
- G. Utiliize "Erico Caddy Cablecat" adjustable cable support when cable trays are not available. Review locations with Architect prior to use.

3.03 SUPPORTING DEVICES

- A. Provide steel angles, channels and other materials necessary for the proper support of wall-mounted cabinets, racks, panels, etc.
- B. Cabinets, large pull boxes, and cable support boxes shall be secured to ceiling and floor slab and not supported from conduits. Small equipment boxes, etc. as approved by Architect, may be supported on walls.
- C. Racks for support of conduit and heavy equipment shall be secured to building construction by substantial structural supports.

3.04 <u>GENERAL</u>

- A. Support raceways from building construction. Do not support from ductwork, piping or equipment hangers.
- B. Support outlet, pull and junction boxes independently from building construction. Do not support from raceways.
- C. Coordinate all raceway runs with other trades.

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- D. Install all open raceways minimum 6 inches away from any light fixture or other source of EMI (Electromagnetic interference)
- E. Bond and ground all horizontal pathways per NEC Article 250.
- F. All horizontal pathways shall be sized for a minimum of 50% future growth.

SUBMITTAL CHECKLIST

1. Product Data

SECTION 17080 – TESTING, IDENTIFICATION AND ADMINISTRATION

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Minimum requirements for the testing, certification, administration and identification of horizontal cabling.
- 1.02 RELATED WORK SPECIFIED ELESWHERE
 - A. Division 16 Electrical.
 - B. Division 17 Technology.

1.03 QUALITY ASSURANCE

- A. All testing procedures and testers shall comply with applicable requirements of:
 - 1. ANSI/TIA/EIA-568-B.1 Commercial Building Telecommunications Cabling Standard, Part 1 General Requirements.
- B. Identification and administration work specified herein shall comply with the applicable requirements of:
 - 1. ANSI/TIA/EIA-606-A Administration Standards.
 - 2. ANSI/TIA/EIA-569-A Pathway and Spaces.
 - 3. ANSI/TIA/EIA-568-B Telecommunications Cabling Standard.
 - 4. ANSI/TIA/EIA-758-A Customer Owned Outside Plant Telecommunications Cabling Standard.
 - 5. BICSI Telecommunications Cabling Installation Manual.
 - 6. BICSI Telecommunications Distribution Methods Manual.

1.04 SUBMITTALS

- A. Manufacturer's catalog sheets and specifications for copper cable testers.
- B. Test Reports.

PART 2 - PRODUCTS

2.01 100 OHM UTP TESTER

- A. Capable of testing to TIA 568-B.1 criteria.
- B. Physical interface shall be modular RJ-45 connector and a serial port with DB-9 connector.
- C. Auto Testing to determine if cable meets requirements of TIA/EIA 568-B.1, ISO Class C, D, 10 Base-T, Token Ring, Fast Ethernet and ATM Standards.
- D. Acceptable Manufacturer: Fluke.

2.02 LABELS

- A. Meet legibility, defacement, exposure and adhesion requirements of UL 969.
- B. Preprinted or laser printed type.
- C. Where used for cable marking, provide vinyl substrate with a white printing area and a clear "tail" that self-laminates the printed area when wrapped around the cable.
- D. Where insert type labels are used, provide clear plastic cover over label.

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- E. A standard style, **size 10, bold** font type shall be used when making faceplate labels. Cable Management Inventory Record shall be used to record all installation details.
- F. Acceptable Manufacturers: Brothers.

PART 3 - EXECUTION

3.01 100 OHM UTP CABLE TESTING

- A. Testing parameters include horizontal Link/channel for all installed drop locations.
- B. Test cable with test set to match NVP for the cable as stated by the cable manufacturer.
- C. Test parameters shall include Wire Map, Length, Attenuation, PSNEXT, PS-ACR, PS-ELFEXT and Return-Loss.
- D. Wire Map:
 - 1. Verify pair to pin termination at each end and check for conductivity errors.
 - 2. Wire map shall indicate the following for each of the eight conductors:
 - a. Continuity to remote end.
 - b. Shorts between any two or more conductors.
 - c. Crossed Pairs.
 - d. Reversed Pairs.
 - e. Split Pairs.
 - f. Any other miss wiring.
- E. Minimum acceptable cable performance per criteria established in TIA/EIA-568-B.1 Category 6 (TIA/EIA 568-B.2-1).

3.02 IDENTIFICATION AND LABELING

- A. Conform to specific labeling requirements outlined below during cable installation and termination.
- B. Horizontal cable shall be marked at each end and on the sheath and indicate:
 - 1. Ultimate destination location.
 - 2. Telecommunications Room, MDF or IDF location.
 - 3. Patch Panel.
 - 4. Panel Port.
- C. All new UTP cable runs shall be numbered before the run and shall be labeled **consecutively** with a unique identification numbering scheme. No new drops shall be duplicated with like numbers. This unique identification numbering scheme is as follows:
 - 1. XX-Y-ZZ.
 - 2. XX is a 2-digit number representing a closet number, such as 00, 01, 02, etc. with 00 being the MDF and 01 is IDF-1, etc.
 - 3. Y indicates the corresponding patch panel ID. Patch panels should be labeled starting with the letter A and progress thru the alphabet for each additional panel.
 - 4. ZZ is a 2-digit number representing the number of the patch panel port on which the cable terminates. This number should range from 1 thru 24 or 1 thru 48.
 - 5. An example would be 00-A-22, where '00' is the MDF, 'A' is patch panel A and '22' is port 22 on patch panel A.

- D. Faceplates and Patch Panels:
 - 1. Optical Fiber Patch Panels:
 - a. Mark fiber patch panels with adhesive labels indicating the range of circuits installed in it.
 - b. Label each port with origination, destination and individual strand ID.
 - 2. Faceplates:
 - a. Label to indicate MDF/IDF number (00 thru 0?), patch panel label (A thru Z) and patch panel (1 thru 24 or 1 thru 48) to which the cable is wired for each cable it houses.

3.03 RECORD COPY AND AS-BUILT DRAWINGS

- A. Provide record copy drawings (in CAD format) periodically throughout the project as requested by the Architect and at end of the project.
- B. Record copy drawings shall include notations reflecting the as-built conditions of any additions to or variation from the drawings provided.
- C. Provide hard copy and electronic copy of cable inventory which includes all circuit numbers for UTP.

3.04 TEST RESULTS

- A. Horizontal Copper Cabling:
 - 1. Contractor shall test all cables and submit all horizontal copper cable test result data in electronic format, with the resulting fire formatted with one (1) test result per 8.5" x 11" page.
 - 2. Provide the test results in an acceptable format:
 - a. Export or download test results from cable tester to a .txt format.
 - b. Open the .txt file in Microsoft Word and save the file as a .doc file.
 - 3. Provide all test results in a 3-ring binder (maximum 3").
 - 4. Label binders
- B. Contractor shall submit (one) 1 copy of software capable of viewing the electronic test results.

SUBMITTAL CHECKLIST

- 1. Product Data for Testing Equipment.
- 2. Test Reports.

SECTION 17090 – SUPPORT AND WARRANTY

1.01 WORK INCLUDED

A. All labor, materials, tools, equipment and certifications required for the complete installation of work required by the Contract Documents.

1.02 CONTRACTOR SUPPORT

- A. Certifications:
 - 1. Cabling installer must be certified.
 - 2. Contractor must have more than 10% of field staff BISCI certified.

B. Repair Service Labor:

- 1. Shall make all repairs or replacements to fulfill obligations of the warranty at no additional cost to the Owner.
- 2. This labor guarantee shall be in full effect for a minimum of 5 years.

1.03 MANUFACTURER WARRANTY

- A. Cable Manufacturer:
 - 1. Provide extended warranty protection for a minimum of 25 years.
 - 2. Cover all manufacturer's products within the cable installation.
 - 3. Shall cover repair or replacement of any length of product found to be defective or not performing to capabilities and specifications of the product.
 - 4. Shall be written for the entire dollar value of the cable's original installation, to allow for full replacement of the cable product if necessary.
- B. Cabling Contractor:
 - 1. Shall be responsible for registering the project on behalf of the Owner.
 - 2. Shall submit the warranty in full effect as part of the closeout documentation.

1.04 SUBMITTALS

- A. Cable manufacturer's warranty information.
- B. Certifications of Contractor and installers.
- C. Contractor labor guarantee for service repair.

SUBMITTAL CHECKLIST

- 1. Cable Manufacturer's Warranty information.
- 2. Contractor Certifications.
- 3. Contractor Labor Guarantee.

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Building Utility Entrances.
 - B. Voice demark.
 - C. Minimum installation requirements for service to the Telecommunications Room, including but not limited to the following:
 - 1. Building Entrance Terminals
 - 2. Surge Protection Modules
 - 3. Steel Ladder Racking
 - 4. Grounding and Bonding
 - 5. Backboards
 - 6. Termination Blocks
 - 7. UTP Cross Connects
 - 8. Utility Coordination

1.02 RELATED WORK SPECIFIED ELESWHERE

- A. Division 16 Electrical
- B. Section 17130 Horizontal Cabling Requirements

1.03 QUALITY ASSURANCE

- A. Materials and work specified herein shall comply with the applicable requirements of:
 - 1. ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard
 - 2. ANSI/TIA/EIA-569-A Commercial Building Standard for Telecommunication Pathway and Spaces
 - 3. TIA/EIA-606-A Administration Standards for Telecommunications Infrastructure
 - 4. TIA/EIA-607-Commercial Building Grounding and Bonding Requirements for Telecommunications
 - 5. NEMA-250
 - 6. Federal Communication Commission 47 CFR 68
 - 7. BICSI Telecommunications Distribution Design Manual (11th edition)
 - 8. BICSI Customer Owned Outside Plant Design Manual (5th edition)
 - 9. BICSI Telecommunications Cabling Installation Manual (5th edition)
 - 10. ANSI/NECA/BICSI-568-2001 Standard for Installing Commercial Building Telecommunications Cabling.
 - 11. ADA-Americans with Disabilities Act
 - 12. NFPA 70 2002 including:
 - a. NEC Article 770
 - b. NEC Article 800
 - 13. Underwriters Laboratory

1.04 SUBMITTALS

- A. Manufacturer's catalog sheets and specifications for:
 - 1. Building Entrance Terminals
 - 2. Surge Protection Modules
 - 3. Steel Ladder Racking
 - 4. Grounding and Bonding
 - 6. Termination Blocks
 - 7. UTP Cross Connects

2.01 BUILDING ENTRANCE TERMINALS

- A. Protect up to 50 lines (pairs) and meet the following requirements:
 - 1. Input stub (tip) cable shall be 26AWG shielded cable. Contractor to field verify actual stub length in field.
 - 2. Input stub shall serve as internal fuse link
 - 3. Input stub shall be equipped with heavy duty strain relief and encapsulated cable connector.
 - 4. Output stub cable shall be 24 AWG shield cable. Contractor to field verify actual stub length in field.
 - 5. Wall or frame mountable
 - 6. Accommodate industry standard 5 pin protection modules.
 - 7. Plastic components meet or exceed UL 497.

2.02 SURGE PROTECTION MODULES

- A. 5-Pin, 3 Element gas type protection modules which meet the following requirements:
 - 1. Provide true balanced operation
 - 2. Over voltage on either side shall cause the entire tube to ionize to provide a simultaneous path to ground for both sides of the circuit.
 - 3. UL 497 listed
 - 4. Ground pin: Tin
 - 5. Tip and Ring pins: Gold alloy
 - 6. Module color: Black
 - 7. Spare Module color: Green
 - 8. Nominal DC Breakdown: 350V @ 100V/µsec
 - 9. Impulse Breakdown Voltage: 700A @ 100V/µsec and 150A @ 1KV/µsec
 - 10. DC Holding Current: 135V for <150ms
 - 11. Surge Life:
 - a. 10A: 10 x 1000µsec > 3000
 - b. 100A: 10 x 1000µsec > 300
 - c. 10kA: 8 x 20µsec > 10
 - d. 20kA: 8 x 20µsec > 1
 - e. 65Arms, 11 cycles: 130A total > 1
 - f. 10Arms, 1 sec: 20A total > 10
 - 12. Capacitance: < 1pf for 1 Vrms @ 1Khz, 50 DCV
 - 13. Insulation Resistance: >100M ohms @ 50 VDC
 - 14. Fail Safe Operation:
 - a. 1A: < 50 sec
 - b. 5A: <15 sec
 - c. 20A: <10 sec
 - d. 60A: < 3 sec
 - 15. Current Limiters:
 - a. Hold Current (ma) @ 20 C = 145
 - b. R min / max ohms = 3/6

2.03 STEEL LADDER RACKING

- A. Provide as necessary for cable support from entrance to cabinet location
- B. Include connecting support hardware to suit installation, including but not limited to:
 - 1. Rack to runway mount plate
 - 2. Wall angle support bracket
 - 3. Butt splice swivel

- 4. Connect junction
- 5. Grounding Kit (Metallic ladder racks must be grounded)
- C. Rack shall be a hollow or solid side bar, nominally 3/8" thick x 1-1/2" high with rungs 9" on center
- D. Finish: Grey or Black factory painted.

2.04 GROUNDING AND BONDING

- A. #6 AWG copper wire
- B. NEMA approved ground bar assembly to meet following requirements:
 - 1. Copper Ground Bar (1/4" x 4" x 10") with 9/32" holes spaced 1-1/8" apart
 - 2. Insulators
 - 3. 5/8" lock washers
 - 4. Wall mounting brackets
 - 5. 5/8" x 11" x 1" HHCS bolts.

2.05 BACKBOARDS

- A. 4' x 8' x 3/4" BCX, fire rated plywood
- B. Painted with acrylic interior, fire-retardant paint, gray color.

2.06 WALL MOUNTED DISTRIBUTION RINGS

- A. Open ended distribution rings for wall mounting
- B. Erico Caddy Fasteners or equal

2.07 TERMINATION BLOCKS ON FRAME

- A. 110 IDC style blocks
- B. 50 pair blocks
- C. Connecting clip, designation strip, plastic covers and retaining clip necessary to terminate cables.

2.09 UTP CROSS CONNECT

- A. Same gauge (22 AWG and 24 AWG) as feed cables to which it is being connected
- B. Colors:
 - 1. White-Blue for voice circuits
 - 2. White-Orange for Ethernet

PART 3 - EXECUTION

3.01 BUILDING ENTRANCE TERMINALS

- A. Shall be wall mounted.
- B. Field verify actual length required for input and output stubs.
- C. Splice feed cable to tip cable for complete installation
- D. Install #6 ground wire as straight as possible from terminal to ground bar.

3.02 SURGE PROTECTON MODULES

A. Install to fully protect all pairs entering building

3.03 LADDER RACK

- A. Install per manufacturers recommendations
- B. Secure to walls and top of equipment rack.
- C. Ground all metallic components of ladder rack.

3.04 GROUNDING AND BONDING

- A. Install grounding bar and connect with #6 AWG copper ground cable to electrical service ground or independently driven ground rod.
- B. Bond all equipment to grounding bar with #6 AWG copper ground cable.
- C. Bond metallic equipment racks, conduits, cable tray, ladder racks to ground bar
- D. All connectors and clamps to be mechanical type made of silicon bronze.
- E. Terminals shall be solderless compression type, copper long-barrel NEMA two bolt.
- F. Bond the shield of shielded cable to the ground bar in Telecommunications Room.

3.05 BACKBOARDS

- A. Install full height on linear wall space used for anchoring equipment.
- B. Start backboard 6" above finished floor and terminate 6" below ceiling.
- C. Anchor backboard to support minumum 1,500 pounds of weight.
- D. Install distribution rings for the cross-connect fields above all wall mounted blocks. Two rings per vertical row of blocks. Mount rings with two hex head screws per ring.

3.06 PUNCH DOWN BLOCKS

- A. Install on plywood backboard. Top of block shall not be higher than 5'-6".
- B. Mount with steel, zinc plated 5/16" slotted hex head, #10 x 3/4" screws.
- C. Install Designation Strips, color-coded with industry standard coded field as required.

3.07 CROSS CONNECT

- A. Cross connects shall be made with 1 pair and 2 pair wire as required by circuit being connected.
- B. Coordinate cross connect colors.

SUBMITTAL CHECKLIST

1. Product Data Sheets

SECTION 17130 – HORIZONTAL CABLING

PART 1 - GENERAL

- 1.01 WORK INCLUDED
 - A. Horizontal cabling is the portion of the UTP cabling system, and other types of cabling, that extends from the work areas to the Main Distribution Frame (MDF) or Intermediate Distribution Frame (IDF). The horizontal cabling shall be configured in a star topology, and include horizontal cables, the mechanically terminated jacks/inserts and the faceplates in the work areas.
 - B. This section also includes minimum requirements for the following:
 - 1. Category 6 UTP Cable.
 - 2. Category 6 Patch Cords and Cables.
 - 3. Category 6 Jacks.
 - 4. Ethernet and PoE Line Extenders.
 - 5. Faceplates.
 - 6. Coaxial Cable.
 - 7. Installation and Termination Methods.

1.02 RELATED WORK SPECIFIED ELESWHERE

- A. Division 16 Electrical.
- B. Division 17 Technology.
- C. Section 17080 Testing, Identification and Administration.

1.03 QUALITY ASSURANCE

- A. Strictly adhere to all Category 6 installation practices when installing UTP data cabling.
- B. Materials and work specified herein shall comply with the applicable requirements of:
 - 1. ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard.
 - 2. ANSI/TIA/EIA-569-A Commercial Building Standard for Telecommunication Pathway and Spaces.
 - 3. TIA/EIA-606-A Administration Standards for Telecommunications Infrastructure.
 - 4. TIA/EIA-607-Commercial Building Grounding and Bonding Requirements for Telecommunications.
 - 5. NEMA-250.
 - 6. Federal Communication Commission 47 CFR 68.
 - 7. BICSI Telecommunications Distribution Design Manual (11th edition).
 - 8. BICSI Customer Owned Outside Plant Design Manual (5th edition).
 - 9. BICSI Telecommunications Cabling Installation Manual (5th edition).
 - 10. ANSI/NECA/BICSI-568-2001 Standard for Installing Commercial Building Telecommunications Cabling.
 - 11. ADA Americans with Disabilities Act.
 - 12. NFPA 70 2002 including:
 - a. NEC Article 770.
 - b. NEC Article 800.
 - 13. Underwriters Laboratory (UL).

1.04 SUBMITTALS

- A. Manufacturer's catalog sheets and specifications for all products to be installed.
- B. Test Results and Documentation per Section 17080.

PART 2 - PRODUCTS

Α.

2.01 CATEGORY 6 UTP CABLE (CAT CABLE)

- Acceptable Manufacturer and Equipment:
- 1. "General Cable"; GenSpeed 6000 Enhanced.
- 2. "Belden"; Data Twist 4800.
- 3. "Panduit"; Pan-Net TX6000.
- 4. "Hubbell"; NEXTSPEED.
- 5. "Remee"; Category 6, 550MHz.
- B. Physical Characteristics:
 - 1. Plenum rated cable.
 - 2. Consist of (4) 23 or 24 AWG twisted copper pairs, 100OHM. All pairs individually insulated.
 - 3. Color Coding:
 - a. Pair 1: Blue-White/Blue.
 - b. Pair 2: Orange-White/Orange.
 - c. Pair 3: Green-White/Green.
 - d. Pair 4: Brown-White/Brown.
 - 4. Fluoropolymer insulation and low-smoke, flame-retardant PVC jacket.
 - 5. Manufacturer's cable is required to test to 400HMz minimum and validated to 250MHz standards.
 - 6. Cable to withstand a bend radius of 1 inch at -20 degrees C without jacket or insulation cracking.
 - 7. Provide cables from all workstation ultimate outlet and device locations and terminated to patch panels in MDF or IDF as indicated on the Drawings.
- C. Compliances:
 - 1. Transmission Characteristics shall meet or exceed ANSI/TIAEIA 568-B.2 or ANSI/TIAEIA 568-C.2.
 - 2. Shall meet applicable requirements of ANSI/ICEA S-80-576.
 - 3. Ultimate breaking strength of 400 N minimum measured in accordance with ASTM D 4565.
 - 4. Labeled third party "Verified Category 6".
- D. Color:
 - 1. Blue: Data.
 - 2. Green: Security Cameras.
 - 3. Purple: Wireless.
 - 4. Yellow: Access Control.
 - 5. Grey: Phone.
 - 6. White: Intercom

2.02 CATEGORY 6 PATCH CORDS AND CABLES

- A. Acceptable Manufacturer and Equipment:
 - 1. See listings for typical Category 6 UTP Cable.
- B. Physical Characteristics:
 - 1. Same performance as all other Category 6 Cable.
 - 2. Data jacks pre-installed at each end of cable.
 - 3. 50% in 5 feet length and 50% in 10 feet length.
 - 4. Provide one patch cable per terminated port in the MDF and IDF.
- C. Color:
 - 1. Blue: Data.
 - 2. Green: Security Cameras.

- 3. Purple: Wireless.
- 4. Yellow: Access Control.
- 5. Grey: Phone.
- 6. White: Intercom
- 2.03 CATEGORY 6 JACKS
 - A. Acceptable Manufacturers and Equipment:
 - 1. "Panduit"; MiniCom Cat6 CJ688.
 - 2. "Panduit"; #CJ688TG Modular Jack.
 - 3. "Belden"; GigaFlex 6+.
 - 4. "Hubbell"; NEXTSPEED Cat6.
 - B. Physical Characteristics:
 - 1. Functional from -10 degrees F to 140 degrees F.
 - 2. Meet or exceed ANSI/TIAEIA 568-B.2 or ANSI/TIAEIA 568-C for Category 6.
 - 3. Modular RJ45 jacks that snap into configured faceplates meeting IEC 603-7 durability requirements.
 - 4. 110 IDC, RJ45 type suitable for eight 22-26 AWG wires and be certified Category 6 compliant.
 - 5. Wired in accordance with EIA/TIA T568B polarization sequence.
 - C. Color:
 - 1. Blue: Data.
 - 2. Green: Security Cameras.
 - 3. Purple: Wireless.
 - 4. Yellow: Access Control.
 - 5. Grey: Phone.
 - 6. White: Intercom

2.04 ETHERNET AND POE LINE EXTENDERS

- A. Acceptable Manufacturers and Equipment:
 - 1. "Nitek"; Ether Stretch, #EL1500U.
- B. Physical Characteristics:
 - 1. Allow for Ethernet and PoE lines of cable to be extended up to 600 meters (2,000 feet) to overcome cable network distance limitations.
 - 2. System containing two separate devices, a transmitter unit and a receiver unit.
 - 3. Shall require no setup or configuration and no network settings to be changed or adjusted.
 - 4. Shall be transparent to the network without MAC or IP addressing.
 - 5. Connections for inline installation of cable run into the networking ports of the transmitter and receiver for immediate communication to network devices.
 - 6. LED indicators for status of network communication and PoE power.
 - 7. Surge protected inputs.
 - 8. Support 10/100 and PoE.
- C. Provide for all line cable runs which exceed the maximum cable length specified for UTP cable.

2.05 <u>FACEPLATES</u>

- A. Acceptable Manufacturers:
 - 1. "Panduit".
 - 2. "Belden".
 - 3. "Hubbell".
 - 4. "Interlink".
 - 5. "Leviton".

- 6. "Phillips".
- 7. "Axis".
- 8. "TecNec".
- 9. "Wiremold".
- B. Description:
 - 1. Stainless Steel.
 - 2. Integral cable labels and easy snap-in assembly.
 - 3. Typical single gang faceplates shall be 2.75" x 4.5" and accept snap-in modules in 3-unit combinations.
 - 4. Typical double gang faceplates shall be 4.5" x 4.5" and accept snap-in modules in 6-unit combinations.
 - 5. Provide for special connections and configurations as indicated on the Drawings or as otherwise required for connections to specific components, whether specifically indicated or not.
 - 6. UL listed.
- 2.06 COAXIAL CABLE (COAX)
 - A. Acceptable Manufacturer and Equipment:
 - 1. "West Penn Wire"; #25806.
 - B. Physical Characteristics:
 - 1. Plenum rated cable.
 - 2. RG6/U Type CCTV.
 - 3. 18 AWG solid stranding, (1) center conductor, 95% bare copper braid.
 - 4. Foam FEP insulation with flexible plenum PVC jacket.
 - 5. 75 OHMS nominal impedance.
 - C. Compliances:
 - 1. UL Listed.
 - 2. CMP NEC rating.
 - 3. UL NFPA 262 flame rating.
 - D. Color: Ivory.

PART 3 - EXECUTION

3.01 UTP CAT CABLE INSTALLATION

- A. Install all wiring concealed in walls in conduit.
- B. Install all exposed wiring in conduit or surface raceway.
- C. Install all wiring above ceilings in open top cable hangers or cable tray.
- D. Support cable above accessible ceilings at 3 feet on center. Attach cable support to building structure.
- E. Do not untwist cable pairs more that 1/2" when terminating.
- F. All cables that do not pass Category 6 requirements shall be removed and replaced at Contractor's expense.
- G. Maximum cable length 90 meters (295 feet).

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- H. Cables shall have no physical defects such as cuts, tears, or bulges in the outer jacket. Cables with defects or damaged shall be replaced at Contractor's expense.
- I. Neatly bundle and tie all cable in closets. Provide 10 feet service loop at each end of cable drop.
- J. Maintain following clearances from EMI sources:
 - 1. Power cable: 6 inches.
 - 2. Fluorescent Lights: 12 inches.
 - 3. Transformers: 36 inches.
- K. Pulling Cable:
 - 1. Do not install Category 6 cable with more than 110N (25 lbs) pull force, as specified in EIA/TIA and BICSI practices.
 - 2. Utilize appropriate cable lubricant in sufficient quantity to reduce friction to acceptable levels for:
 - a. Long pulls inside conduit.
 - b. Pulls of multiple cables into a single small bore conduit.
 - c. Conduit runs that exceed 180 degrees of accumulated bends.
 - 3. Use tensile rated cords (ie fishing line) for difficult or questionable pulls to judge whether a particular pulling situation is within the tolerances outlined.
- L. Cable jackets that are chaffed or burned exposing internal conductor insulation or have any bare copper (shiners) shall be replaced.
- M. Firestop all openings where cable is installed though a fire barrier or rated assembly.
- N. Terminate cable per EIA/TIA T568B or T568C standard pin assignments.
- O. Test, label and document per Section 17080.

3.02 INSERTS AND FACEPLATES

- A. All cables shall be terminated with high density modular jacks that snap into a faceplate mounted on a wall outlet box or surface raceway.
- B. Outlet boxes shall be secured to building with mechanical fasteners. Adhesive fasteners are not allowed.
- C. All openings not used shall be fitted with appropriate blank inserts.
- D. Test, label and document per Section 17080.

SUBMITTAL CHECKLIST

- 1. Product Data Sheets.
- 2. Test Results.

SECTION 17910 – SECURITY SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide all labor, materials, tools, equipment, software, licenses, etc. for complete, fully functioning, turn-key digital video surveillance system as outlined in the Contract Documents.
- B. Systems and Equipment:
 - 1. Interior Network Security Cameras.
 - 2. Exterior Network Security Cameras.
 - 3. Video Surveillance Appliance / Security DVR.
 - 4. Video Surveillance System Server.
 - 5. Network Video Management Software.
- C. Coordinate installation and integration with following related systems:
 - 1. Electrical.
 - 2. Technology and Communications.

1.02 RELATED WORK SPECIFIED ELESWHERE

- A. Division 16 Electrical
- B. Section 17080 Testing
- C. Section 17100 Telecommunications Rooms
- D. Section 17130 Horizontal Cabling

1.03 QUALITY ASSURANCE

- A. System contractor must be certified reseller of specified product.
- B. System technicians must be certified installer of specified product.
- C. Installer must have a service facility and organization with staffing capable of providing comprehensive maintenance and service to the specified systems within 48 hours after receiving a call.

1.04 SUBMITTALS

- A. Manufacturer's catalog sheets and specifications for all products to be installed.
- B. Warranty information.
- C. Installer and technician certifications for selected system.
- D. Test Results and Documentation per Section 17080.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Rough-in components shall be delivered for timely installation without delay to other trades and project progress.
- B. All other equipment and components shall not arrive onsite until building is fully enclosed, climate conditioned, ceiling grid in place and walls finished.
- C. Protect all equipment on-site before and after installation until Owner occupancy.

1583.01

1.06 OWNER TRAINING

- A. A minimum of two (2) hours training of all components, equipment, software and systems is required.
- B. Coordinate with the Owner's Technology Coordinator for all training.

PART 2 - PRODUCTS

- 2.01 INTERIOR CAMERAS (LAY-IN CEILING TYPE)
 - A. Basis of Specification: Manufacturer and Equipment:
 - 1. "Axis Communications"; Axis M30 Network Camera Series, #M3014.
 - B. Description:
 - 1. Recessed ceiling mount within lay-in acoustical ceiling system. Integral ceiling mounting system. Mounting trims, accessories, connector kit as required.
 - 2. Fixed dome.
 - 3. Power Over Ethernet (POE).

2.02 INTERIOR CAMERAS (LAY-IN CEILING TYPE – POINT OF ENTRY)

- A. Basis of Specification: Manufacturer and Equipment:
 - 1. "Axis Communications"; Axis P33 Network Camera Series, #P3364-V.
- B. Description:
 - 1. Recessed ceiling mount within lay-in acoustical ceiling system.
 - "Axis" #IP51-rated drop-ceiling mount kit. Mounting trims, accessories, connector kit as required.
 - 2. Fixed dome with vandal resistant housing.
 - 3. Power Over Ethernet (POE).

2.03 INTERIOR CAMERAS (SURFACE-MOUNT TYPE)

- A. Basis of Specification: Manufacturer and Equipment:
 - 1. "Axis Communications"; Axis P33 Network Camera Series, #P3364-V.
- B. Description:
 - 1. Same camera as specified for "Interior Cameras (Lay-In Ceiling Type Point Of Entry)" except: Surface-mount on wall surface.
 - Surface mounting bracket. Mounting trims, accessories, connector kit as required.

2.04 EXTERIOR CAMERAS (SURFACE-MOUNT TYPE)

- A. Basis of Specification: Manufacturer and Equipment:
 - 1. "Axis Communications"; Axis P33 Network Camera Series, #P3367-VE.
- B. Description:
 - Surface-mount on wall surface. Surface mounting bracket. Mounting trims, accessories, connector kit, weather shield, cable shield, gasketing as required.
 - 2. Fixed dome with vandal resistant housing, rated for exterior use.
 - 3. Power Over Ethernet (POE).

2.05 EXTERIOR CAMERAS (POST-MOUNT TYPE)

- A. Basis of Specification: Manufacturer and Equipment:
 - 1. "Axis Communications"; Axis P33 Network Camera Series, #P3367-VE.

B. Description:

 Same camera as specified for "Exterior Cameras (Surface-Mount Type)" except: Post-mount on wall surface, site light pole or post.
 Wall or corner mounting bracket as applicable. Pendant mount with adapter and post.
 Mounting trims, accessories, connector kit, weather shield, cable shield, gasketing as required.

2.06 VIDEO SURVEILLANCE APPLIANCE / SECURITY DVR

- A. Basis of Specification: Dell, Cisco or HP Server
- B. Description
 - 1. Rack Mounted
 - 2. RAID 6 storage
 - 3. Intel Core, 2 Quad, 2 Ghz+ processor
 - 4. 12 GB RAM, Minimum
 - 5. Hard drive storage capacity, 24 TB minimum
 - 6. 100/1000 Gigabit Ethernet Network Interface Card
- C. Appliance shall support:
 - 1. Complete network video security management
 - 2. Up to 50 IP Cameras
 - 3. Recording at full video resolution capability of cameras
 - 4. Recording rate up to 30 PPS per camera

2.07 NETWORK VIDEO MANAGEMENT SOFTWARE

- A. Acceptable Manufacturers:
 - 1. "Axis Communications"; Camera Station.
- B. Description:
 - 1. Internet accessible IP-surveillance software.
 - 2. Unlimited concurrent users.
 - 3. Live view of all cameras.
 - 4. By the minute motion activity timeline.
 - 5. Search video based on camera, date and time.
 - 6. Search video based on non-motion events.
 - 7. Control playback speed and direction.
 - 8. Configurable motion detection criteria.
 - 9. Megapixel camera support.

2.08 NETWORK SWITCHES

- A. Smart Switch, Rack Mounted, 48 port, PoE
- B. PoE wattage as required for cameras supplied

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All installations shall be in accordance with manufacturer's specifications and published recommendations.
- B. Focus and aim all interior and exterior units (pan, tilt, rotation, zoom, focus) as coordinated with Owner personnel present and to their satisfaction. Re-aim as required for desired security coverage.

- C. Where cameras are installed within existing lay-in acoustical ceiling systems, remove tile as required for installation of unit within tile and to provide access to wiring above ceiling. Neatly cut hole through ceiling tile to install camera tight and secure to ceiling system. Wire complete. Reinstall ceiling tile. Replace any ceiling tiles damaged by construction activities with new to match existing ceiling system.
- D. Install server system complete with all connections for a complete and fully functioning system.
- E. Install software and complete setup with Owner's Technology Coordinator.

3.02 SYSTEM ACCEPTANCE

A. An authorized representative of the Owner along with Architect shall review all video surveillance components to assure they are properly installed and functional.

SUBMITTAL CHECKLIST

- 1. Product Data Sheets.
- 2. Warranty information.
- 3. Certifications.
- 4. Test Results.

SECTION 17920 – ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide all labor, materials, tools, equipment, software, licenses, etc. for a complete, fully functioning, turn-key access control system as outlined in the Contract Documents.
- B. Systems and Equipment:
 - 1. Multi-Technology Credential Readers.
 - 2. Access Control Credentials.
 - 3. Access Control Card Printers.
 - 4. Control Wiring.
 - 5. Access Control Network Appliances.
 - 6. Access Control Door Controllers.
 - 7. Controllers.
 - 8. Sub-Controller Reader Modules.
 - 9. Access Control System Software.
- C. Coordinate installation and integration with all other technology systems, electrical and door hardware.
- D. See Door Access Riser Diagrams on Drawings.

1.02 RELATED WORK SPECIFIED ELESWHERE

- A. Division 16 Electrical
- B. Section 08710 Finish Hardware
- C. Section 17080 Testing, Identification and Administration
- D. Section 17100 Telecommunications Room
- E. Section 17130 Horizontal Cabling

1.03 QUALITY ASSURANCE

- A. System contractor must be a certified reseller of specified product.
- B. System technicians must be a certified installer of specified product.
- C. Installer must have a service facility and organization with staffing capable of providing comprehensive maintenance and service to the specified systems within 48 hours after receiving a call.

1.04 SUBMITTALS

- A. Manufacturer's catalog sheets and specifications for all products to be installed.
- B. Warranty information.
- C. Installer and technician certifications for selected system.
- D. Test Results and Documentation per Section 17080.
- E. Door Access Riser Diagrams, noting any alterations required for the selected equipment to be installed.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Rough-in components shall be delivered for timely installation without delay to other trades and project progress.
- B. All other equipment and components shall not arrive onsite until building is fully enclosed, climate conditioned, ceiling grid in place and walls finished.
- C. Protect all equipment on-site before and after installation until Owner occupancy.

1.06 OWNER TRAINING

A. A minimum of 2 hours training of all components is required with selected Owner's representative(s).

PART 2 - PRODUCTS

2.01 MULTI-TECHNOLOGY CREDENTIAL READERS (WALL MOUNT TYPE)

- A. Acceptable Manufacturers and Equipment:
 - 1. "aptiQ"; MT15.
- B. Description:
 - 1. Capable of reading both proximity card and smart card type credentials.
 - 2. Single-gang wall-mount reader for installation on wall surface location.
 - 3. Read range up to 5 inches for proximity cards and 4 inches for smart cards.
 - 4. Tri-state LED (red, green, amber).
 - 5. Visual indicator and audio feedback representing status and activity information.
 - 6. Weatherproof for exterior installation.
 - 7. Color: Black.
 - 8. Provide electrical backbox.

2.02 ACCESS CONTROL CREDENTIALS (PROXIMITY CARDS)

- A. Acceptable Manufacturers and Equipment:
 - 1. "XceedID"; 7510.
- B. Proximity Card:
 - 1. Contactless card.
 - 2. ISO style card.
 - 3. Glossy white composite material.
 - 4. Slot punch horizontal along the short dimension of card.
 - 5. Capable of custom printing directly onto card.
 - 6. Programmable and re-programmable.
 - 7. Operates on 125 kHz frequency.
- C. Provide 100 blank cards.

2.03 ACCESS CONTROL CARD PRINTERS

- A. Acceptable Manufacturers and Equipment:
 - 1. "MagiCard"; Rio Pro.
- B. Description:
 - 1. Capable of printing both proximity card and smart card type credentials.
 - 2. 100 card feeder with separate single card hand feed capability input.

- 3. 70 card stacker output.
- 4. USB and Ethernet interfaces.
- 5. Single-sided printing.
- 6. Full color printing.
- 7. 300 dpi print.
- 8. Edge-to-edge printing.
- 9. Provide with printer lock feature on the door and the input and output hoppers.
- C. Provide with full initial set of dye film consumables and maintenance sets for an additional 1,000 prints.

2.04 CONTROL WIRING

A. See Specification 17130 – Horizontal Cabling.

2.05 ACCESS CONTROL NETWORK APPLIANCES

- A. Acceptable Manufacturers and Equipment:
 - 1. "Open Options, Inc."; NController.

B. Description:

- 1. Network-ready access control appliance unit.
- 2. Provide intelligent support for network door controllers, sub-controllers and readers.
- 3. Provides intelligent support for up to (32) 2-door controller units, total of (64) individual doors.
- 4. Rack-mounted unit, to be installed in designated server rack, 1RU.
- 5. Connect to network via standard Ethernet jack.
- 6. Communicate system activity in real time over the network to be recorded and displayed by the Access Control System Software.
- 7. Onboard RAM memory, 15 MB minimum.
- 8. Provide with backup battery.

2.06 ACCESS CONTROL DOOR CONTROLLERS

- A. Acceptable Manufacturers and Equipment:
 - 1. "Open Options, Inc."; E2 Series.
- B. Description:
 - 1. Pre-manufactured, factory-assembled, pre-wired unit.
 - 2. 16"x20" metal enclosure with removable cover, conduit knockouts and mounting holes.
 - 3. Project may require multiple separate enclosures and power distribution boards as required for varying power outputs for both 12v and 24v to serve all the selected equipment.
 - 4. To include all types and quantities of all items required to operate the door(s) and equipment served to function as intended per the Drawings and riser diagrams. Contractor to verify all requirements and include all required items within enclosure.
- C. Shall Contain:
 - 1. Power Supply.
 - 2. Power Distribution Board.
 - 3. Self-contained Transformer.
 - 4. Tamper Switch.
 - 5. Battery Backup with built-in charger.
 - 6. Controllers.
 - 7. Sub-Controller Reader Modules.

2.07 CONTROLLERS (WITHIN ACCESS CONTROL PANELS)

- A. Acceptable Manufacturers and Equipment:
 - 1. "Open Options, Inc."; SSP-D2.
- B. Description:
 - 1. To be included within factory-assembled Access Control Panels.
 - 2. 2-door controller unit.
 - 3. IP-ready intelligent controller with a built-in reader interface module allowing control of doors and access control components.
 - 4. Shall connect directly to the local area network and Access Control System Software.

2.08 <u>SUB-CONTROLLER READER MODULES (WITHIN ACCESS CONTROL PANELS)</u>

- A. Acceptable Manufacturers and Equipment:
 - 1. "Open Options, Inc."; RSC-2.
- B. Description:
 - 1. To be included within factory-assembled Access Control Panels.
 - 2. Dual reader unit.
 - 3. Provides interface between door devices and the Controller.
 - 4. Support for proximity readers, keypad readers, magnetic stripe Weigand and EIA-485.
 - 5. 8 programmable inputs.
 - 6. 6 relay outputs.
 - 7. Stores up to 8 facility codes for offline access decisions.

2.09 ACCESS CONTROL SYSTEM SOFTWARE

- A. Acceptable Manufacturers and Equipment:
 - 1. "Open Options, Inc."; DNA Fusion Security Management Server Software.
- B. Internet-accessible system with the following requirements:
 - 1. Unlimited concurrent users.
 - 2. Live view of all system activities.
 - 3. Continuous log of all credential activities: date and time.
 - 4. Time schedule and mode management.
 - 5. Provide all licenses as required for all users and devices.
 - 6. Provide most current version of software with all latest updates, installed on LAN server.
 - 7. Provide all licenses and software updates as required for a 5-year time period.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All installations shall be in accordance with manufacturer's specifications and published recommendations.
- B. All systems shall function as intended and as shown or indicated on the drawings and riser diagrams.

3.02 SYSTEM ACCEPTANCE

A. An authorized representative of the Owner along with the Architect shall review all access control components to assure they are properly installed and functional.

SUBMITTAL CHECKLIST

- 1. Product Data Sheets.
- 2. Warranty information.
- 3. Certifications.
- 4. Test Results.
- 5. Door Access Riser Diagrams.