

SPECIFICATIONS AND PROJECT MANUAL

FOR FURNISHING ALL LABOR
AND MATERIALS
FOR

NEW LOPEZ HOUSE

AND
RELATED WORK

TO BE BUILT AT

TAMAYA, OLD PUELBLO OF SANTA ANA

SANTA ANA PUEBLO, NM 87004



Architect's Project Number: 341 (Q)

100% CONSTRUCTION DOCUMENTS

July 10, 2026

John Barton Architects, LLC
1600 Lena Street, B-4 upstairs, Santa Fe, NM 87505

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**INVITATION TO BID
CONSTRUCTION CONTRACT**

BID NUMBER:
Sealed bid opening date:
JULY 16 : 10:00 AM
PUEBLO OF SANTA ANA
PURCHASING DEPARTMENT

OWNER:
PUEBLO OF SANTA ANA
02 Dove Road
Santa Ana, NM 87004

DATE: July 10, 2026

**PROJECT: LOPEZ HOUSE
RENOVATION, TAMAYA, OLD
PUEBLO OF SANTA ANA, NM**

Contact Names:
TBD

DESIGN PROFESSIONAL OF RECORD:
JOHN BARTON ARCHITECTS, LLC
1600 LENA ST., SUITE B-4 UPSTAIRS
SANTA FE, NM 87505

**IMPORTANT: BIDS MUST BE SUBMITTED IN
A SEALED ENVELOPE WITH THE BID
NUMBER AND OPENING DATE CLEARLY
INDICATED ON THE BOTTOM LEFT HAND
SIDE OF THE FRONT OF THE ENVELOPE.**

BID OPENING ADDRESS:
PURCHASING DEPT.
PUEBLO OF SANTA ANA
02 DOVE ROAD
SANTA ANA, NM 87004
Telephone:

SEALED BIDS WILL BE RECEIVED AT THE ABOVE SPECIFIED DATE, LOCAL TIME AND ADDRESS THEN PUBLICLY OPENED AT THE ABOVE SPECIFIED ADDRESS AND READ ALOUD. BIDS NOT RECEIVED BY THE ABOVE SPECIFIED DATE, LOCAL TIME AND AT THE LISTED ADDRESS PRIOR TO BID TIME, WILL NOT BE OPENED OR CONSIDERED. DELIVERY IS SOLELY THE RESPONSIBILITY OF THE BIDDER.

THIS BID IS SUBJECT TO THE REQUIREMENTS OF THE BIDDING DOCUMENTS AS DEFINED IN THE "INSTRUCTIONS TO BIDDERS," SECTION 00100.

THE BID PROPOSAL FORM MUST BE ACCOMPANIED BY A SURETY BOND, SUBCONTRACTOR LISTING FORM, AND DOCUMENTS SPECIFIED IN THE "INSTRUCTIONS TO BIDDERS."

This mailing contains three pages

INVITATION TO BID page 2

Bids shall be presented in the form of a total Base Bid proposal, under a Lump Sum Contract, plus any additive or deductive alternates, that are selected by the Owner. A bid must be submitted on all bid items and alternates; segregated bids will not be accepted. Plans and specifications are available from the Design Professional of Record.

Bidders may also purchase a CD, with the Bid Documents, from Albuquerque Reprographics, Inc., (ARI), at their cost.

NOTE: Base Bid and Additive Alternate prices shall not include state gross receipts or local options taxes. Taxes will be included in the Contracted Amount at prevailing rates as a separate item to be paid by Owner.

In submitting this bid, each Bidder must satisfy all terms and conditions of the Bidding Documents.

All work covered by this Invitation to Bid shall be in accordance with applicable state laws.

INVITATION TO BID page 3

Bid Security in the form of a surety bond, executed by a surety company authorized to do business in the State of New Mexico, in the amount of **5%** of the total bid, or the equivalent in cash, by means of a cashier's check, or in a form satisfactory to the Owner, must accompany each bid in accordance with the Instructions to Bidders.

A 100% Performance Bond and a 100% Payment and Materials Bond, executed by a surety company authorized to do business in the State of New Mexico, shall be required from the successful Bidder prior to award of contract.

A completed Subcontractor Listing Form must accompany each bid.

Each subcontractor shall provide a performance and payment bond on a public works building project if the subcontractor's contract (to the Contractor) for work to be performed on a project is fifty thousand dollars (\$50,000) or more. Failure of a Subcontractor to provide required bond shall not subject the Owner to any increase in cost due to approved substitution of Subcontractor.

The Bidding Documents contain a time for completion of the work and further impose liquidated damages for failure to complete the work within that time period.

No Bidder may withdraw his bid for **45 days** after the actual date of the opening thereof.

The Owner intends to award this Project to the lowest responsive and responsible Bidder. The Owner reserves the right to reject any and all bids, to waive technical irregularities, and to award the contract to the Bidder whose bid it deems to be in the best interest of the Owner.

Attention of the Bidder is particularly directed to the current requirements as to Resident and Resident Veteran Contractor's Preference per Section 13-4-2 NMSA 1978. The provisions of

Sections 13-4-1 through 13-4-4 NMSA 1978 are not applicable to projects receiving Federal aid or when the expenditure of Federal funds designated for a specific contract is involved.

Requests for approval of substitutions for "or equal" material or equipment, if allowed by the contract documents, must include a detailed itemized comparison of the proposed substitution, with the specified product, and be submitted at least 10 days prior to the bid date, in accordance with Paragraph 3.3 of the Instructions to Bidders.

No pre-bid meeting is scheduled.

END OF INVITATION TO BID



AIA Document A701

Instructions to Bidders

1987 EDITION

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INSTRUCTIONS TO BIDDERS

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 signed 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.

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 and the Bid is made in accordance therewith.

2.1.2 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, for other portions of the Project, if any, being bid concurrently or presently under construction.

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.

3.1.2 Bidding Documents will not be issued directly to Sub-bidders or others 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 In making copies of the Bidding Documents available on the above terms, the Owner and the Architect do so only for the purpose of obtaining Bids on the Work and do not confer a license or grant permission for any other use 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 in the Contract Documents.

3.4 ADDENDA

3.4.1 Addenda will be mailed or delivered 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 No Addenda will be issued 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.

ARTICLE 4

BIDDING PROCEDURES

4.1 FORM AND STYLE OF BIDS

4.1.1 Bids shall be submitted on forms identical to the form included with the Bidding Documents.

4.1.2 All blanks on the bid form shall be filled in by typewriter or manually in ink.

4.1.3 Where so indicated by the makeup of the bid form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, 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 include the legal name of the Bidder and a statement that the Bidder is a sole proprietor, partnership, corporation or other legal entity. 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 If so stipulated in the Advertisement or Invitation to Bid, or supplementary instructions to bidders, each Bid shall be accompanied by a bid security in the form and amount required, pledging that the Bidder will 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 Subparagraph 6.2.1.

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 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 or telegraphic Bids are invalid and will not receive consideration.

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.

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 or by telegram; if by telegram, written confirmation over the signature of the Bidder shall be mailed and postmarked 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 modified or resubmitted.

ARTICLE 5

CONSIDERATION OF BIDS

5.1 OPENING OF BIDS

5.1.1 Unless stated otherwise in the Advertisement or Invitation to Bid, the properly identified Bids received on time will be opened publicly and will be read aloud. An abstract of the Bids will be made available to Bidders. When it has been stated that Bids will be opened privately, an abstract of the same information may, at the discretion of the Owner, be made available to the Bidders within a reasonable time.

5.2 REJECTION OF BIDS

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

5.3 ACCEPTANCE OF BID (AWARD)

5.3.1 It is the intent of the Owner to award a Contract to the lowest responsible 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 or 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

6.1.1 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

6.2.1 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 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.

6.3.3 Prior to the award 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 Subparagraph 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

8.1 FORM TO BE USED

8.1.1 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.

INSTRUCTIONS TO BIDDERS – PART B

Section 00 2113

1.0 BID ENVELOPE

The Bid envelope shall be addressed at the front center of the envelope to:

***PURCHASING DEPT.
PUEBLO OF SANTA ANA
02 DOVE ROAD
SANTA ANA, NM 87004***

Also on the front of the envelope the Bidder shall mark: the name and address of the Bidder shall in the upper left corner; the name of project, Invitation to Bid Number, date of opening and, time of opening in the lower left corner; and, "**SEALED BIDS ENCLOSED**" in the lower right corner or otherwise on the face thereof.

BID FORM (Lump Sum or Unit Price)

BIDDER’S Name and Address:

Telephone:

Fax:

Federal Tax ID #:

New Mexico Tax ID #:

CID License #

PROJECT NAME: **Lopez House and Related Work**
PROJECT NO:
ARCHITECT PROJECT NO: **341 (Q)**

LOCATION: Tamaya, Old Pueblo of Santa Ana, Santa Ana, NM

This Bid is submitted to Owner:

**Pueblo of Santa Ana
In care of the Pueblo’s
Purchasing Agent:
02 Dove Road, Santa Ana Pueblo,
NM 87004**

1. The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an agreement with the Owner in the form included in the Bidding Documents to perform and furnish all Work as specified or indicated in the Bidding Documents for the Contract Price and within the Contract Time indicated in this Bid and in accordance with the other terms and conditions of the Contract Documents.
2. The Bidder accepts all of the terms and conditions of the Invitation for Bid and Instructions to Bidders, including without limitation those dealing with the disposition of bid security and other Bidding Documents. This Bid will remain subject to acceptance for forty-five (45) days after the day of Bid opening. The Bidder shall sign and submit the Agreement between Owner and Contractor (hereinafter called Agreement) with the Bonds and other documents required by the Bidding Requirements within fifteen (15) days after the date of the Owner's Notice of Award.
3. In submitting this Bid, the Bidder represents, as more fully set forth in the Agreement, that:
- A. the Bidder has examined copies of all the Bidding Documents and of the following Addenda (receipt of all of which is hereby acknowledged):

No. Title: Date:

No. Title: Date:

No. Title: Date:

No. Title: Date:

No. Title: Date:

B. the Bidder has familiarized themselves with the nature and extent of the Bidding Documents, Work, site, locality, and all local conditions, laws, and regulations that in any manner may affect cost, progress, performance, or furnishing of the Work;

C. the Bidder has carefully studied all reports and drawings of subsurface conditions which are identified in the Information Available to Bidders and accepts the determination set forth in the Information Available to Bidders of the extent of the technical data contained in such reports and drawings upon which the Bidder is entitled to rely;

D. the Bidder has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Bidding Documents;

E. the Bidder has given the Design Professional written notice of all conflicts, errors, and discrepancies that he has discovered in the Bidding Documents, and the written resolution thereof by the Design Professional is acceptable to the Bidder;

F. this Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; the Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; the Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and the Bidder has not sought by collusion to obtain for himself any advantage over any other Bidder or over the Owner;

G. not used

H. the Bidder agrees to show clearly on the Bid and the envelope in which the Bid is submitted the Project Name and Number, and Invitation to Bid Number; and,

I. the Bidder will complete the Work for the following price(s) (**do not include any gross receipts tax in the price(s)**).

4. Bids shall be presented in the form of a total Base Bid proposal under a Lump Sum Contract plus additive alternates that are selected by the Owner. A bid must be submitted on all bid items and alternates; segregated bids will not be selected by the Owner.

A. LUMP SUM PRICE (please use typewriter or print legibly in ink) Base Bid (use words):
Furnish and install all labor and materials for the construction of the **Lopez House** and related work as indicated in the Bid Documents:

(\$)

B. ADDITIVE ALTERNATE NO. ONE: N.A.

(\$)

|

All specific cash allowances are included in the price(s) set forth above.

C. UNIT PRICES: N.A.

5. The Bidder agrees that:

A. The Work to be performed under this Contract shall be commenced not later than ten (10) consecutive days after the date of written Notice to Proceed, and that Substantial Completion shall be achieved not later than **One Hundred Twenty (120)** days after the date of written Notice to Proceed, except as hereafter extended by valid written Change Order by the Owner.

B. Should the Contractor neglect, refuse, or otherwise fail to complete the Work within the time specified, the Contractor agrees to pay to the Owner in partial consideration for the award of this Contract the amount of Two Hundred Fifty Dollars (\$250) per consecutive day, not as a penalty, but as liquidated damages for such breach of the Contract.

C. The above prices shall include all labor, materials, removal, overhead, profit, insurance, taxes (**not including gross receipts tax**), etc., to cover the finished work of the several kinds called for. Changes shall be processed in accordance with the Contract Documents.

D. It is understood that the Owner reserves the right to reject any or all Bids and to waive any technical irregularities in the bidding.

7. The following documents are attached to and made a condition of this Bid:

- A.** Subcontractors Listing;
- B.** Preference Forms

8. The terms used in this Bid and the Bidding and Contract Documents which are defined in the Conditions of the Construction Contract (General, Supplementary, and Other Conditions), included as part of the Bidding Documents, have the meanings assigned to them in those Conditions.

9. The Bidder is a(n):

A. INDIVIDUAL;

By: _____
(Individual's Signature)
Doing business as: _____
Business address: _____

Telephone: (____) _____

FAX: (____) _____

B. PARTNERSHIP:

By: _____
(Firm Name)

(General Partner's Signature)
Business address: _____

Telephone: (____) _____

FAX: (____) _____

C. CORPORATION:

Corporation Name: _____

State of Incorporation: _____

By _____ Title: _____
(Print Name of Person Authorized to Sign)

* _____

Signature of Authorized Person

If a New Mexico Corporation: _____
NM Certificate of Incorporation Number

If a Foreign Corporation: _____
NM Certificate of Authority Number

Attest (Secretary): _____

Business address _____

Telephone: (____) _____

FAX: (____) _____

CORPORATE SEAL HERE

or,

D. JOINT VENTURE:

By _____
(Name)

Address: _____

Telephone: (____) _____

FAX: (____) _____

By _____
(Name)

Address: _____

Telephone: (____) _____

FAX: (____) _____

By _____

(Name)

Address: _____

Telephone: (____) _____

FAX: (____) _____

Each Joint Venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated in the appropriate category.

BIDDER MUST FILL IN THE FOLLOWING (if none, write none)

NM License Number _____ License Classification: _____

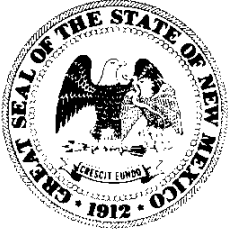
Dept. of Workforce Solutions Minimum Wage Act Registration Number
(DWS#) _____

Resident Contractor's Preference Number: _____

Local Contractor's Preference Number: _____

Native American Owned Business Preference Number: _____

AGENT'S AFFIDAVIT



THIS FORM MUST
BE USED BY
SURETY

(To be filled in by Agent)

STATE OF _____)
) ss.
COUNTY OF _____)

_____, being first duly sworn, deposes and says that
he /

she is the duly appointed agent for
and is
licensed in the State of New Mexico.

Deponent further states that a certain bond was given to indemnify the Pueblo of Santa Ana
in connection with the construction of

dated the _____ day of _____, 20____, executed by
Contractor, as principal, and _____, as surety, signed by this
Deponent; and Deponent further states that said bond was written, signed, and delivered by
him/her; that the premium on the same has been or will be collected by him/her; and that the full
commission thereon has been or will be retained by him/her.

Subscribed and sworn to before me, a notary public in and for the County of,
, this _____ day of My _____, 20____.

Notary Public

Commission Expires:

AGENT'S ADDRESS:

Telephone

**COMBINED
LIST OF SUBCONTRACTORS
and
ASSIGNMENT OF ANTITRUST CLAIMS
by
CONTRACTOR, SUBCONTRACTORS,
SUBSUBCONTRACTORS, and SUPPLIERS**

EXAMPLE TRADES AND SUPPLIERS: SITE WORK, CONCRETE, MASONRY, FRAMING, LUMBER, STEEL, STEEL FABRICATION, ROOFING, EXTERIOR INSULATION AND FINISH, DRYWALL, DOORS, GLASS AND GLAZING, PLASTER, PAINTING, CARPET, RESILIENT, CONVEYING SYSTEMS, HVAC, CONTROLS, PLUMBING, SHEET METAL, ELECTRICAL
--

1. Subcontractor Listing shall be included with Bid as a condition of the Bid and be fully complete with regards to all Subcontractors providing services valued at \$5,000.00 or more, or one-half of one percent of the architect's or engineer's estimate of the total project cost, not including alternates, whichever is greater pursuant to Section 13-4-34, NMSA 1978.

Listing Threshold for this Project: \$5,000.00

a. Subcontractor Listing shall be expanded after Bid by apparent low bidder if Awarded, and before Contract, to include major Suppliers and, each entity listed shall be signed by individual empowered to obligate Supplier, Subcontractor, or Subsubcontractor.

b. Subcontractor Listing shall also be expanded after Bid by apparent low bidder if Awarded, and before Contract, to include the Department of Workforce Solutions labor enforcement fund registration number. See the Department of Workforce Solutions web site at www.dws.state.nm.us under "Public Works" for registration form, listings and information.

c. See Instructions to Bidders, Section 00 2113 Paragraph 4.5, Subcontractors, for rules regarding changes in this list after bidding.

2.

PROJECT NAME: Lopez House, Tamaya, Old Pueblo of Santa Ana, Santa Ana, NM

INVITATION TO BID NUMBER:

PROJECT NO:

ARCHITECT PROJ NO: 341 (Q)

The undersigned agrees that any and all claims which the firm may have or may inure to it for overcharges resulting from antitrust violations as to goods, services, and materials purchased in connection with the above-referenced project are hereby assigned to the Owner, but only to the extent that such overcharges are passed on to the Owner. It is agreed that the firm retains all rights to any such antitrust claims to the extent of any overcharges not passed on to the District, including the right to any treble damages attributable thereto.

INVITATION TO BID NUMBER:

PROJECT NO:

ARCHITECT NO: 341 (Q)

Sealed bid opening date:
July 16, 2026; 10:00 AM

Pueblo of Santa Ana

Subcontractor Listing

*Signature not required until after Bid but before Award

TYPE OF WORK	ENTITY NAME	CITY & STATE	Labor enforcement fund registration # (if over \$60,000)	SIGNATURE *
SITE WORK				
CONCRETE				
MASONRY				
FRAMING				
STEEL ERECTION				
ROOFING				
INSULATION				
DRYWALL				
GLAZING				
PLASTER				
FLOORING				
PAINTING				
FURNISHINGS				
HVAC				
CONTROLS				
PLUMBING				
ELECTRICAL				
SPECIAL SYST.				

PREQUALIFICATION

GENERAL

The Contractor represents to the Owner that the Contractor:

1. is financially solvent, able to pay debts, and has sufficient working capital to complete the Work;
2. is able to furnish the plant, tools, materials, supplies, equipment, skilled labor and sufficient experience and competence required to complete the Work equal to or exceeding industry standards;
3. shall, prior to bid, be properly licensed according to the requirements of the Construction Industries Licensing Act, Chapter 60, Article 13 NMSA 1978 and ensures to the Owner that such license shall remain in effect for the duration of the Work and warranty periods that the Contractor is authorized and properly licensed to do business in the State of New Mexico and in the locale where the Work is located;
4. execution of the agreement and performance thereof is within the Contractor's duly authorized powers; and
5. or assigns have visited the site of Work and has become familiar with the conditions under which the Work is to be performed, obtained all available information and have correlated observations and acquired information with the requirements of the Contract

Documents including conditions:

- a) bearing upon access to the site, accommodations required, transportation, disposal, handling and storage;
 - b) affecting availability of labor, materials, equipment, water, electricity, utilities and roads;
 - c) such as weather, river stages, flooding;
 - d) related to the apparent form and nature of the Work site, including the surface and sub-surface conditions; and,
 - e) that in general would be deemed by a prudent contractor to be material to the Work as to assess risk, contingencies and other circumstances;
6. has completed prior contracts with diligent and continuous effort and has been responsive to post-occupancy corrections.

PREQUALIFICATION FORMS

Not required.

DEBARRED OR SUSPENDED CONTRACTORS

A business (contractor, subcontractor, or supplier) that has either been debarred or suspended pursuant to the requirements of Sections 13-1-177 through 13-1-180 and 13-4-11 through 13-4-17, NMSA 1978 as amended, shall not be permitted to do business with the State and shall not be considered for award of contract during the period for which it is debarred or suspended.



AIA Document A101

Standard Form of Agreement Between Owner and Contractor

*where the basis of payment is a
STIPULATED SUM*

1987 EDITION

*THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES; CONSULTATION WITH
AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS COMPLETION OR MODIFICATION.*

*The 1987 Edition of AIA Document A201, 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.*

This document has been approved and endorsed by The Associated General Contractors of America.

AGREEMENT

made as of the _____ day of _____ in the year of
Nineteen Hundred and _____

BETWEEN the Owner:

(Name and address)

and the Contractor:

(Name and address)

The Project is:

(Name and location)

The Architect is:

(Name and address)

The Owner and Contractor agree as set forth below.

Copyright 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, ©1987 by The American Institute of Architects, 1735 New York Avenue, N.W., Washington, D.C. 20006. Reproduction of the material herein or substantial quotation of its provisions without written permission of the AIA violates the copyright laws of the United States and will be subject to legal prosecution.

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; these 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 Modifications, appears in Article 9.

ARTICLE 2
THE WORK OF THIS CONTRACT

The Contractor shall execute the entire Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

ARTICLE 3
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 The date of commencement is the date from which the Contract Time of Paragraph 3.2 is measured, and shall be the date of this Agreement, as first written above, 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.)

Unless the date of commencement is established by a notice to proceed issued by the Owner, the Contractor shall notify the Owner in writing not less than five days before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

3.2 The Contractor shall achieve Substantial Completion of the entire Work not later than

(Insert the calendar date or number of calendar days after the date of commencement. Also insert any requirements for earlier Substantial Completion of certain portions of the Work, if not stated elsewhere in the Contract Documents.)

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to complete on time.)

ARTICLE 4
CONTRACT SUM

4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of _____ Dollars (\$ _____), 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 decisions on other alternates are to be made by the Owner subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date until which that amount is valid.)

4.3 Unit prices, if any, are as follows:

ARTICLE 5

PROGRESS PAYMENTS

5.1 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.

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

5.3 Provided an Application for Payment is received by the Architect not later than the _____ day of a month, the Owner shall make payment 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.

5.4 Each Application for Payment shall be based upon the 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 and be 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.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

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

5.6.1 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 total 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 the dispute may be included as provided in Subparagraph 7.3.7 of the General Conditions even though the Contract Sum has not yet been adjusted by Change Order;

5.6.2 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 (_____ %);

5.6.3 Subtract the aggregate of previous payments made by the Owner; and

5.6.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Paragraph 9.5 of the General Conditions.

5.7 The progress payment amount determined in accordance with Paragraph 5.6 shall be further modified under the following circumstances:

5.7.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to _____ percent (_____ %) of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work and unsettled claims; and

5.7.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Subparagraph 9.10.3 of the General Conditions.

5.8 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 Subparagraphs 5.6.1 and 5.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

ARTICLE 6

FINAL PAYMENT

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (1) the Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct nonconforming Work as provided in Subparagraph 12.2.2 of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 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.)

(Usury laws and requirements under the Federal Truth in Lending Act, similar state and local consumer credit laws and other regulations at the Owner's and Contractor's principal places of business, the location of the Project and elsewhere may affect the validity of this provision. Legal advice should be obtained with respect to deletions or modifications, and also regarding requirements such as written disclosures or waivers.)

7.3 Other provisions:

ARTICLE 8

TERMINATION OR SUSPENSION

8.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of the General Conditions.

8.2 The Work may be suspended by the Owner as provided in Article 14 of the General Conditions.

ARTICLE 9
ENUMERATION OF CONTRACT DOCUMENTS

9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

9.1.1 The Agreement is this executed Standard Form of Agreement Between Owner and Contractor, AIA Document A101, 1987 Edition.

9.1.2 The General Conditions are the General Conditions of the Contract for Construction, AIA Document A201, 1987 Edition.

9.1.3 The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated , and are as follows:

Document	Title	Pages
----------	-------	-------

9.1.4 The Specifications are those contained in the Project Manual dated as in Subparagraph 9.1.3, and are as follows:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Pages
---------	-------	-------

9.1.5 The Drawings are as follows, and are dated

unless a different date is shown below:

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

Number

Title

Date

9.1.6 The addenda, if any, are as follows:

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 Other documents, if any, forming part of the Contract Documents are as follows:

(List here any additional documents which are intended to form part of the Contract Documents. The General Conditions provide 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.)

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER

CONTRACTOR

(Signature)

(Signature)

(Printed name and title)

(Printed name and title)



CAUTION: You should sign an original AIA document which has this caution printed in red. An original assures that changes will not be obscured as may occur when documents are reproduced.

Instructions:

1. **Contractor** shall attach pre-signed or un-signed form to Performance Bond and Labor and Material Bond and submit to Design Professional with Post-Bid submittals (see Section 00 2113 - Instructions to Bidders).
2. **Owner** shall review Surety for acceptability and, if approved, sign form prior to approval of Contract.

REVIEW AND APPROVAL:

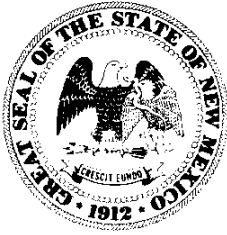
This Bond has been executed by a Surety named in the current list of "companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies," as published in Circular 570 (amended) by the Audit Staff Bureau of Accounts, United States Treasury Department.

APPROVED:

By: _____
Owner's Representative or Governing Authority

Date: _____

AGENT'S AFFIDAVIT



THIS FORM MUST
BE USED BY
SURETY

(To be filled in by Agent)

STATE OF _____)
) ss.
COUNTY OF _____)

_____, being first duly sworn, deposes and says that
he /

she is the duly appointed agent for
and is
licensed in the State of New Mexico.

Deponent further states that a certain bond was given to indemnify the Pueblo of Santa Ana in
connection with the construction of

dated the _____ day of _____, 20____, executed by
Contractor, as principal, and _____, as surety, signed by this
Deponent; and Deponent further states that said bond was written, signed, and delivered by
him/her; that the premium on the same has been or will be collected by him/her; and that the full
commission thereon has been or will be retained by him/her.

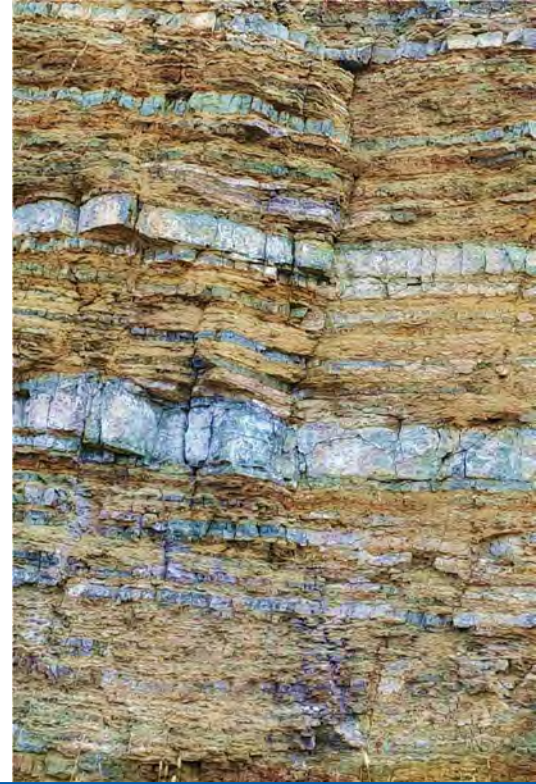
Subscribed and sworn to before me, a notary public in and for the County of,
, this _____ day of _____, 20____.

Notary Public

My Commission Expires:

AGENT'S ADDRESS:

Telephone



GEOTECHNICAL ENGINEERING REPORT

TAMAYA RESIDENCES PUEBLO OF SANTA ANA, NEW MEXICO

Submitted To:

John Barton, AIA
John Barton Architects, LLC
1600 Lena Street B.4
Santa Fe, New Mexico 87505

GEOMAT PROJECT NO. 252-5484A
August 27, 2025

00 6131 GEOTECHNICAL REPORT





7901 Lorraine Court NE ♦ Albuquerque, New Mexico 87113 ♦ (505) 300-5816

August 27, 2025

John Barton, AIA
John Barton Architects, LLC
1600 Lena Street B.4
Santa Fe, New Mexico 87505

RE: Geotechnical Engineering Report
Tamaya Residences
Pueblo of Santa Ana, New Mexico
GEOMAT Project No. 252-5484A

GEOMAT Inc. (GEOMAT) has completed the geotechnical engineering exploration for the Tamaya Residences project to be located in Pueblo of Santa Ana, New Mexico. This study was performed in general accordance with our Proposal No. 252-05-17A, dated May 19, 2025.

The results of our engineering study, including the geotechnical recommendations, site plan, boring records, and laboratory test results are attached. Based on the geotechnical engineering analyses, subsurface exploration, and laboratory test results, the site is considered suitable for the proposed residences. Other design and construction details, based upon geotechnical conditions, are presented in the report.

We appreciate being of service to you in the geotechnical engineering phase of this project. If you have any questions concerning this report, please contact us.

Sincerely yours,

GEOMAT Inc.

A handwritten signature in blue ink, appearing to read "Patrick Gallegos".

Patrick Gallegos, P.E.
Geotechnical Department Manager



J. Aaron Ezzell, P.E.
Albuquerque Branch Manager

Copies to: Addressee (1)

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Site Plan
Logs of Borings
Unified Soil Classification
Test Drilling Equipment and Procedures

APPENDIX B

Summary of Soil Tests
Consolidation Test Results
Laboratory Testing Procedures

APPENDIX C

Important Information About This Geotechnical Engineering Report (Taken From GBA)

EXECUTIVE SUMMARY

The Tamaya Residences project consists of the construction of four (4) new residences as detailed later in this report. The following summarizes our general conclusions and recommendations in support of the project:

- Based on the geotechnical engineering analyses, subsurface exploration, and laboratory test results, we are providing recommendations for the proposed residences to be supported on conventional shallow concrete spread type footings or monolithic slabs with turned down edges bearing on engineered fill or a Tensar NXF geogrid-reinforced base course building pad.
- A Seismic Site Class of D is estimated to be appropriate for the site. Parameters for Risk Category II have been provided. Parameters for alternative Risk Categories can be provided upon request.
- The native sandy soils do appear suitable for direct re-use as engineered (structural) fill material.

1.0 INTRODUCTION

This report contains the results of our geotechnical engineering exploration for the Tamaya Residences project located in Pueblo of Santa Ana, New Mexico, as shown on the Site Plan in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations about:

- subsurface soil conditions
- groundwater conditions
- foundation design and construction
- site classification
- lateral soil pressures
- earthwork
- drainage

The opinions and recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, experience with similar soil conditions and structures, and our understanding of the proposed project as stated below.

2.0 PROPOSED CONSTRUCTION

We understand the project involves demolishing four (4) existing residences (Robbins, Armijo, Ortiz, and Garcia) and constructing four (4) new residences, each approximately 2,000 square feet in size, in their place. The existing Robbins residence is a standalone structure, while the Armijo, Ortiz, and Garcia residences are currently adjoined and connected to additional structures on either side. The new residences are anticipated to be a maximum of two stories in height, constructed with wood framing and adobe, and supported by conventional shallow spread footings with concrete slab-on-grade floors or monolithic slabs with turned down edges.

Structural loads were not provided; however, we anticipate maximum loads on the order of 50 kips for column loads and 2 kips/lf for wall loads. We anticipate that no basements or below-grade structures are planned, and that minimal site grading will be required to achieve final site grades. The exact geometries of the existing footings were unknown at the time of this report. We understand that the existing residences have exhibited some cracking in the adobe walls and some distress to the concrete floor slabs.

3.0 SITE EXPLORATION

Our scope of services performed for this project included a site reconnaissance, a subsurface exploration program, laboratory testing, and engineering analyses.

3.1 Field Exploration

Subsurface conditions at the site were explored on July 28, 2025, by drilling a total of eight (8) exploratory borings at the approximate locations shown on the Site Plan in Appendix A. Borings B-1 through B-4 were drilled adjacent to the Robbins residence. Borings B- 5 through B-6 were drilled adjacent to the Armijo, Ortiz, and Garcia residences. All borings were drilled to a depth of approximately 26 feet below the ground surface (bgs).

The borings were advanced using a CME-75 truck-mounted drill rig with continuous-flight, 7.25-inch O.D. hollow-stem augers. Soil samples were obtained from the borings using a combination of standard 2-inch O.D. split spoon and 3-inch O.D. ring-lined barrel samplers. The samplers were driven using a 140-pound hammer falling 30 inches. The standard penetration resistance was determined by recording the number of hammer blows required to advance the samplers in six-inch increments. A representative bulk sample of the subsurface materials was also obtained.

The borings were continuously monitored by a professional from our office who examined and classified the subsurface materials encountered, obtained representative samples, observed groundwater conditions, and maintained a continuous log of each boring. The Boring Logs are presented in Appendix A. Soils were classified in accordance with the Unified Soil Classification System described in Appendix A.

3.2 Laboratory Testing

Samples retrieved during the field exploration were transported to our laboratory for further evaluation. At that time, the field descriptions were confirmed or modified as necessary, and laboratory tests were performed to evaluate the engineering properties of the subsurface materials.

4.0 SITE CONDITIONS

The proposed building sites are located approximately 480 feet southeast of the intersection of Indian Service Route 74, and Indian Service Route 76 in Santa Ana Pueblo, New Mexico. The project site is bound by residential properties to the north, south, east, and west. The Jemez River runs northwest to southeast approximately 450 feet southwest of the project sites. The sites were relatively flat and level. The ground surface was compacted soil with large cottonwood trees close to some borings.

The following photograph depicts the site at the time of our exploration.



General Site Conditions, View Toward the NE from the Vicinity of B-2

5.0 SUBSURFACE CONDITIONS

5.1 Soil Conditions

As presented on the Boring Logs in Appendix A, we encountered predominantly sandy soils containing varying amounts of silt. Occasional interbedded clay layers were encountered

throughout the borings along with some cobble and gravel lenses. The sandy soils were generally very loose to medium dense, light brown to dark brown, and damp to wet.

5.2 [Groundwater Conditions](#)

Groundwater was encountered in borings B-1, B-2, B-3, B-7, and B-8 at depths ranging from 16 feet to 20 feet below the ground surface at the time of drilling. Groundwater was not encountered in the other borings. Groundwater elevations can fluctuate over time depending upon precipitation, irrigation, runoff, and infiltration of surface water. We do not have any information regarding the historical fluctuation of the groundwater level in this vicinity.

5.3 [Laboratory Test Results](#)

Laboratory analyses of representative samples indicate that the native sandy soils tested have fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) ranging between approximately 11 and 32 percent. Plasticity index testing indicates that the sandy soils are non-plastic. The in-place dry densities of the sandy soils range from approximately 96 to 118 pounds per cubic foot (pcf), with a natural moisture content ranging of approximately 3 to 15 percent.

Laboratory consolidation/expansion testing was performed on ring samples of the subgrade soils obtained from beneath the proposed buildings. Results of these tests indicate that the soils undergo slight compression when subjected to anticipated foundation stresses at existing moisture contents. When subjected to increased moisture conditions at these stresses, the soils undergo slight to moderate compression. With an increase in loading at these moisture conditions, the soils undergo moderate to significant additional compression.

Corrosivity analyses were conducted on representative samples taken from borings B-1, and B-5. These results are discussed in the [Corrosion and Cement Type](#) section of this report.

Complete results of all laboratory tests are presented in Appendix B.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 [Geotechnical Considerations](#)

The site is considered suitable for the proposed buildings based on the geotechnical conditions

encountered and tested for this report. However, the existing soils are moisture sensitive and potentially compressible and could undergo volume changes in response to increases in moisture or applied loads, resulting in distress to structures supported on them. Based on these conditions, the existing soils are not suitable for direct support of the structures in their existing condition.

To reduce the potential for distress due to soil movements and provide more uniform and higher allowable bearing pressures, the proposed structures should be supported on conventional shallow spread footings or monolithic slabs with turned down edges bearing on engineered fill. As an alternative, we are providing recommendations for the buildings to be supported on conventional shallow spread footings or monolithic slabs with turned down edges bearing on Tensar NXF geogrid-reinforced stabilized base course building pads. This method reduces the amount of engineered fill required when compared to conventional spread footings bearing on engineered fill. Engineered fill and/or Tensar NXF geogrid-reinforced stabilized base course buildings pad should conform to the recommendations presented in the [Foundations](#) and [Earthwork](#) sections of this report.

Consideration should be given to supporting the buildings on deep foundations such as drilled piers or helical piers. Utilizing deep foundations such as drilled piers or helical piers would substantially reduce the possibility and risk for post construction movements related to possible wetting of the subsurface soils. Utilizing deep foundations would also reduce the amount of earthwork that is associated with supporting the buildings on engineered fill. However, we also understand that deep foundations are likely to be uneconomical for the buildings and that conventional foundations are likely the preferred foundation system. Additional recommendations for deep foundation could be provided upon request.

Due to the close proximity of the existing buildings, care should be taken during construction to avoid affecting or undermining the foundations of the existing building. Temporary shoring or other means and methods may be required to stabilize the existing building during construction of the residences. Design or geotechnical recommendations for temporary shoring were not a part of the scope of services for this project. GEOMAT can provide recommendations for temporary shoring upon request, however, additional subsurface exploration may be required to develop such recommendations. RamJack of New Mexico could also be contacted to discuss possible underpinning options for the existing building.

Consideration could also be given to structurally cantilevering new footings toward the existing building so that earthwork activities can maintain a reasonable distance from the existing

building or structurally doweling into the existing footings. The project structural engineer will need to make these evaluations and determinations.

It should be noted that there may be differential movement between the existing buildings and adjacent buildings. The architectural/structural design of the residences should account for this possibility. Placement of new footings in relation to the existing footings should be as discussed in the [Foundations](#) section below.

It is of paramount importance to provide good positive drainage away from the buildings to ensure that surface water is transmitted away. Consideration should be given to paving adjacent to the structures on all sides or otherwise surfacing with a low-permeability material to prevent surface water infiltration next to the structures. If necessary, we recommend raising site grade to improve drainage and reduce the potential for the underlying soils to become wet.

If there are any significant deviations from the assumed finished elevations, structure locations and/or loads noted at the beginning of this report, the opinions and recommendations of this report should be reviewed and confirmed/modified as necessary to reflect the final planned design conditions.

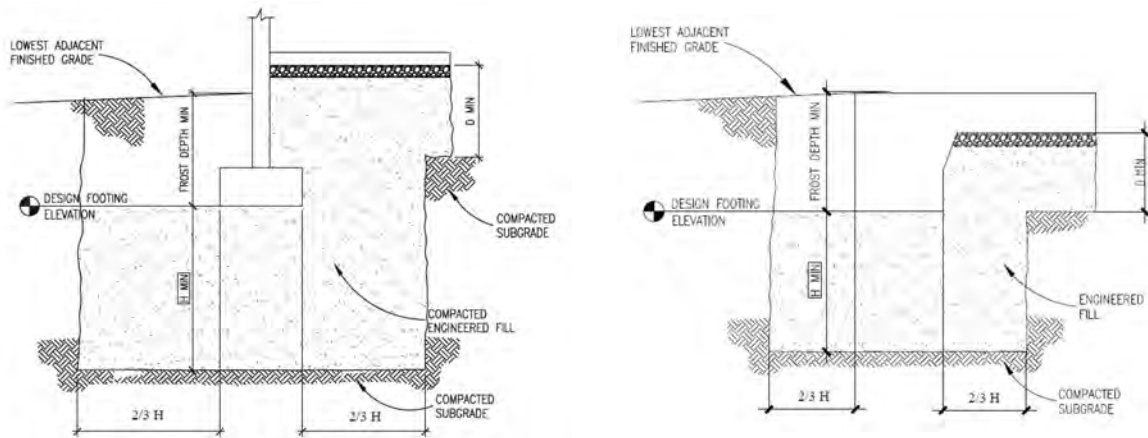
6.2 [Foundations](#)

[Shallow Spread Footings or Monolithic Slabs with Turned Down Edges Bearing on Engineered Fill](#)

Based on our understanding of the type of structures to be built and the results of our field subsurface exploration and laboratory testing, we are providing recommendations for the proposed buildings to be founded on conventional shallow spread footings bearing on engineered fill. To reduce the potential for differential settlement and provide more uniform and higher allowable bearing pressures, the footings should bear entirely on engineered fill.

Two (2.0) feet and sixteen (16.0) inches are the minimum recommended widths of square and continuous footings, respectively.

Generalized depictions of a shallow spread footing and floor slab and a monolithic slab with turned down edges supported on engineered fill are shown in the diagrams below.



Footings bearing on engineered fill should bear a minimum of one and one-half (1.5) feet below finished grade to provide protection against frost heaving. The recommended design bearing capacity and footing depth are presented in the following table.

Recommended Allowable Bearing Capacity

Footing Depth ¹ (ft)	Allowable Bearing Pressure (psf)	Bearing Material
1.5 ²	1,500	Engineered Fill

¹ Footing depth referenced below lowest adjacent finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

² Minimum footing depth for frost protection.

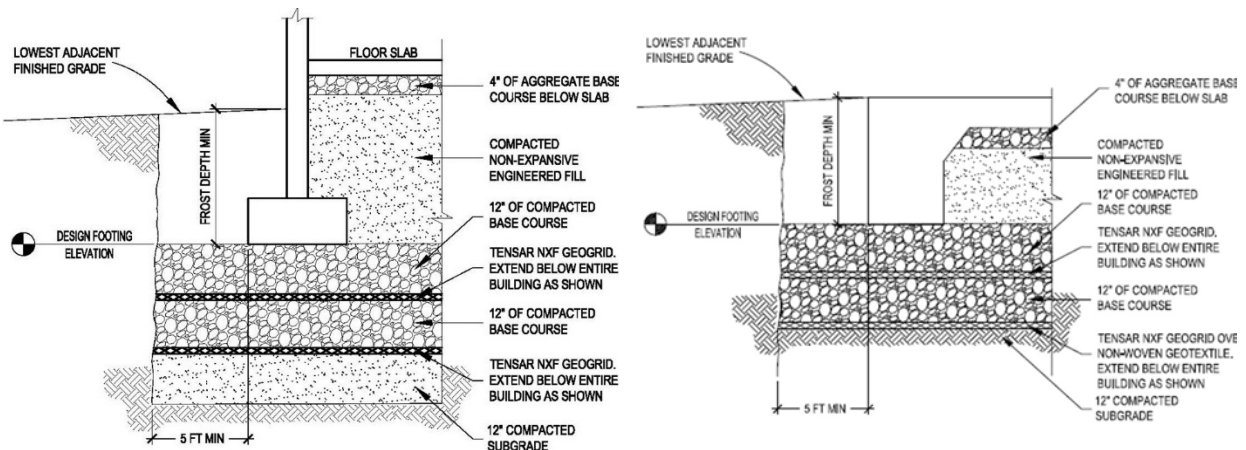
In reference to the diagram above, we recommend providing engineered fill for a minimum thickness below the footings, H, of five (5.0) feet. A greater thickness of engineered fill may be required if undocumented fill or other loose or disturbed soil is encountered during construction. The engineered fill should extend laterally beyond the edges of the footings for a minimum distance of two thirds the thickness of engineered fill below the footings, $2/3 H$ unless where doing so would undermine adjacent structures. If the entire building area(s) is excavated for the engineered fill placement, the engineered fill should extend at least five (5.0) feet beyond the perimeter of the building(s). New footings should be at or below the elevations of existing footings to avoid imposing additional surcharge onto the existing footings.

Recommendations for earthwork beneath the concrete slab-on-grade floors can be found in the [Floor Slab Design and Construction](#) section of this report.

Shallow Spread Footings or Monolithic Slabs with Turned Down Edges Bearing on Tensar Geogrid Building Pad

The residences could be supported on conventional shallow spread footings or monolithic slabs with turned down edges bearing on a Tensar NXF geogrid-reinforced stabilized base course building pad. To reduce the potential for differential settlement and provide more uniform and higher allowable bearing pressures the entire building footprint should be supported on Tensar geogrid stabilized fill consisting of two layers of Tensar NXF geogrid with twelve (12.0) inches of compacted base course overlying each layer. Prior to placement of the geogrid reinforced sections, the existing subgrade soils should be scarified to a depth of twelve (12.0) inches, moisture conditioned and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557, and at a moisture content near optimum. The geogrid stabilized fill section should be extended entirely beneath the building and for a minimum distance of five (5.0) feet beyond the outside edge of the building footings unless where doing so would undermine existing adjacent footings. The geogrid should be installed per the manufacturer's recommendations.

Generalized depictions of a shallow spread footing and monolithic slab with turned down edges supported on Tensar geogrid-reinforced stabilized fill are shown in the diagrams below.



Footings should bear a minimum of one and one-half (1.5) feet below finished grade to provide protection against frost heaving. The recommended design bearing capacity and footing depth are presented in the following table.

Recommended Allowable Bearing Capacity (New Building)

Footing Depth ¹ (ft)	Allowable Bearing Pressure (psf)	Bearing Material
1.5 ²	3,000	Tensar Geogrid Stabilized Fill ³

¹ Footing depth referenced below lowest adjacent finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

² Minimum footing depth for frost protection.

³ Tensar NX750 or NX850

Base course used in Tensar geogrid stabilized fill should meet the requirements as described in the [Fill Materials and Placement and Compaction](#) sections of this report.

General Foundation Considerations

Materials and compaction criteria for engineered fill should follow recommendations in the [Earthwork](#) section of this report.

Additional recommendations pertaining to the design and construction of retaining walls are presented in the [Lateral Earth Pressures](#), [Earthwork](#), and [Subsurface Drainage](#) sections of this report.

Adequate drainage should be provided to prevent the supporting soils from undergoing significant moisture changes.

Total and differential settlements resulting from the assumed structural loads are estimated to be on the order of three-fourths (3/4) of an inch or less. Total and differential settlements should not exceed predicted values, provided that:

- Foundations are constructed as recommended, and;
- Essentially no changes occur in water contents of foundation soils.

For foundations adjacent to descending slopes, a minimum horizontal setback of five (5) feet should be maintained between the foundation base and slope face. In addition, the setback should be such that an imaginary line extending downward at 45 degrees from the nearest foundation edge does not intersect the slope.

Footings and foundations should be reinforced as necessary to reduce the potential for distress

caused by differential foundation movement.

Foundation excavations should be observed by GEOMAT. If the subsurface conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

6.3 Floor Slab Design and Construction

For the Tensar geogrid-reinforced stabilized building pad section, ground floor slabs should be placed on compacted non-expansive engineered fill as shown in the diagrams found above in the [Foundations](#) section of this report. If the residences are to be founded entirely on engineered fill the ground floor slabs should be placed on a minimum thickness, D, of three (3.0) feet of engineered fill.

General Floor Slab Considerations

On-site or imported soils with low expansive potentials the meet specification for engineered (structural fill) should be used in fills that will support the floor slabs and exterior concrete walkways. Some differential movement of slab-on-grade systems is possible if the subgrade soils become elevated in moisture content. Such movements are considered within general tolerance for normal slab-on-grade construction. To reduce potential slab movements, the subgrade soils should be prepared as outlined in the [Earthwork](#) section of this report.

For structural design of concrete slabs-on-grade, a modulus of subgrade reaction of 200 pounds per cubic inch (pci) may be used for floors supported on compacted engineered fill.

Additional floor slab design and construction recommendations are as follows:

- Control joints should be provided in slabs to control the location and extent of cracking. Joint spacing should be designed by the structural engineer.
- Interior trench backfill placed beneath slabs should be compacted in accordance with recommended specifications outlined below.
- In areas subjected to normal loading, a minimum 4-inch layer of clean-graded gravel, aggregate base course should be placed beneath interior slabs. For heavy loading, re-evaluation of slab and/or base course thickness may be required.

- Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.
- If moisture sensitive floor coverings are used on interior slabs, consideration should be given to the use of membranes to help reduce the potential for vapor rise through the slab.

Subgrade preparation and moisture control recommendations provided in this report help to reduce soil related problems that may result in distress of concrete floor slabs on grade. However, concrete drying shrinkage, temperature induced volume change, and curling can create cracking and distress in the concrete slabs-on-grade. To reduce distress from these causes, properly proportioned concrete mixes with adequate curing and proper joint spacing must be provided. These options should be discussed with the project Architect/Engineer.

6.4 Site Classification

Based on the subsurface conditions encountered in the borings, we estimate that Site Class D is appropriate in accordance with the International Building Code. This parameter was estimated based on extrapolation of data beyond the deepest depth explored, using methods allowed by the code. Actual shear wave velocity testing/analysis and/or exploration to a depth of 100 feet were not performed as part of our scope of services for this project.

Seismic design parameters for the project site were determined in accordance with the procedure in the International Building Code. These values are based on a Risk Category of II and Site Class of D. The seismic design parameters are presented in the table below.

Recommended Seismic Design Parameters

Parameter	Value
S_S	0.461g
S_1	0.152g
S_{MS}	0.660g
S_{M1}	0.348g
S_{DS}	0.440g
S_{D1}	0.232g

S_S = mapped spectral response acceleration at short periods

S_1 = mapped spectral response acceleration at 1-second period

S_{MS} = maximum considered earthquake spectral response acceleration for short periods

S_{M1} = maximum considered earthquake spectral response acceleration for 1-second period

S_{DS} = five percent damped design spectral response acceleration at short periods

S_{D1} = five percent damped design spectral response acceleration at 1-second period

g = gravitational acceleration, approximately 9.8 m/sec² or 32.2 ft/sec²

6.5 Corrosion and Cement Type

Representative samples of the soil from borings B-1 and B-5 were tested to evaluate the potential for the on-site soils to corrode buried metal and/or concrete. The samples were tested for pH, electrical resistivity, and soluble sulfates. Results of these tests are summarized in the following table.

Laboratory Corrosivity Test Results

Sample No.	Boring No.	Sample Depth (ft)	pH	Resistivity (ohm-cm)	Sulfates (%)
30431	B-1	1 – 5	6.19	2,500	< 0.02
30439	B-5	1 – 5	6.08	5,500	0.02

Corrosion of Concrete

American Concrete Institute (ACI) 318-14 Table 19.3.1.1 (as referenced in the 2018 International Building Code) presents the following exposure categories and classes for the water-soluble

sulfate (SO_4^{2-}) content in soil. Exposure category S applies to concrete in contact with soil or water containing deleterious amounts of water-soluble sulfate ions.

Exposure Class			
Category	Class	Condition	
		Water-Soluble Sulfate (SO_4^{2-}) in soil, percent by mass ^[1]	Dissolved sulfate (SO_4^{2-}) in water, ppm ^[2]
Sulfate (S)	S0	$\text{SO}_4^{2-} < 0.10$	$\text{SO}_4^{2-} < 150$
	S1	$0.10 \leq \text{SO}_4^{2-} < 0.20$	$150 \leq \text{SO}_4^{2-} < 1,500$ or seawater
	S2	$0.20 \leq \text{SO}_4^{2-} < 2.00$	$1,500 \leq \text{SO}_4^{2-} < 10,000$
	S3	$\text{SO}_4^{2-} > 2.00$	$\text{SO}_4^{2-} > 10,000$

^[1] Percent sulfate by mass in soil shall be determined by ASTM C1580.

^[2] Concentration of dissolved sulfates in water, in ppm, shall be determined by ASTM D516 or ASTM D4130.

The soluble sulfate contents of the samples tested were less than 0.10 percent by mass as determined by ASTM C1580. Based on these test results and the table above, the samples are characterized as **Sulfate Exposure Class S0**.

American Concrete Institute (ACI) 318-14 Table 19.3.2.1 presents the requirements shown in the table below for concrete by water-soluble sulfate (SO_4^{2-}) exposure class. The project engineers or architects should review the applicable building codes to confirm the accuracy of the information presented below and any possible project specific considerations. All concrete should be designed, mixed, placed, finished, and cured in accordance with the guidelines presented by the ACI.

Laboratory Corrosivity Test Results						
Exposure Class	Maximum w/cm ^[1]	Minimum f'_c , psi	Cementitious Materials ^[3] - Types			Calcium Chloride Admixture
			ASTM C150	ASTM C595	ASTM C1157	
S0	N/A	2,500	No type restriction	No type restriction	No type restriction	No restriction
S1	0.50	4,000	II ^{[4][5]}	Types IP, IS, or IT with (MS) designation	MS	No restriction
S2	0.45	4,500	V ^[5]	Types IP, IS, or IT with (HS) designation	HS	Not permitted
S3	0.45	4,500	V plus pozzolan or slag cement ^[6]	Types IP, IS, or IT with (HS) designation plus pozzolan or slag cement ^[6]	HS plus pozzolan or slag cement ^[6]	Not permitted

^[1] The maximum w/cm limits in Table 19.3.2.1 do not apply to lightweight concrete.

^[3] Alternative combinations of cementitious materials to those listed in Table 19.3.2.1 are permitted when tested for sulfate resistance and meeting criteria in 26.4.2.2(c) of the ACI 318-14.

^[4] For seawater exposure, other types of Portland cements with tricalcium aluminate (C_3A) contents up to 10 percent are permitted if the w/cm does not exceed 0.40.

^[5] Other available types of cement such as Type I or Type III are permitted in Exposure Classes S1 or S2 if the C_3A contents are less than 8 percent for Exposure Class S1 or less than 5 percent for Exposure Class S2.

^[6] The amount of the specific source of the pozzolan or slag cement to be used shall be at least the amount that has been determined by service record to improve sulfate resistance when used in concrete containing Type V cement. Alternatively, the amount of the specific source of the pozzolan or slag cement to be used shall be at least the amount tested in accordance with ASTM C1012 and meeting the criteria in 26.4.2.2(c) of the ACI 318-14.

Corrosion of Metals

Corrosion of buried ferrous metals can occur when electrical current flows from the metal into the soil. As the resistivity of the soil decreases, the flow of electrical current increases, increasing the potential for corrosion. A commonly accepted correlation between soil resistivity and corrosion of ferrous metals is shown in the following table.

Metal Corrosion Potential

Resistivity (ohm-cm)	Corrosivity
0 to 1,000	Severely Corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately Corrosive
>10,000	Mildly Corrosive

The samples tested had resistivity values ranging from 2,500 to 5,500 ohm-cm. Based on these laboratory results and the table above, the on-site soils would be characterized as **moderately corrosive** toward ferrous metals. The potential for corrosion should be considered during the design process. If using metals resistant to these corrosive conditions presents an economic consideration for this project, we recommend performing a field resistivity test to compare to the laboratory test.

6.6 Lateral Earth Pressures

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements are presented in the following table:

Lateral Earth Pressures

Parameter	Equivalent Fluid Pressures (psf/ft)			Coefficient
	Active	At-Rest*	Passive	
Granular soil backfill	35	50	--	--
Undisturbed subsoil	30	60	--	--
Shallow foundation walls	--	--	250	--
Shallow column footings	--	--	350	--
Base Friction	--	--	--	0.40**

* Where the design includes restrained elements; the following equivalent fluid pressures are recommended

** The coefficient of base friction should be reduced to 0.30 when used in conjunction with passive pressure.

Retaining wall backfill material should be selected as recommended in the [Earthwork](#) section of this report. Medium to high plasticity soils should not be used as backfill against retaining walls.

Imported soils or gravel meeting the criteria given the [Subsurface Drainage](#) portion of this report should be used directly against the retaining walls.

Fill against grade beams and retaining walls should be compacted to densities specified in the [Earthwork](#) section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over compaction may cause excessive lateral earth pressures that could result in wall movement.

6.7 [Slopes](#)

Assuming fill specifications, compaction requirements, and recommended setbacks provided in this report are followed, cut and fill slopes as steep as to 3:1 (horizontal:vertical) should be stable. Depending upon specific project conditions, adequate factors of safety against slope failure may be available for steeper configurations. However, such a determination would require additional analysis.

6.8 [Earthwork](#)

[General Considerations](#)

The opinions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. Although underground facilities such as foundations, septic tanks, cesspools, basements, and irrigation systems were not encountered during site reconnaissance, such features could exist and might be encountered during construction.

[Site Clearing](#)

The following site clearing recommendations should be considered at minimum:

- Strip and remove all existing pavement, fill, debris, and other deleterious materials from the proposed building and pavement areas. Any existing structures should be completely removed from below any new structure, including foundation elements and any associated development such as underground utilities, septic tanks, etc. All exposed surfaces below footings and slabs should be free of mounds and depressions which could prevent uniform compaction.
- If unexpected fills or underground facilities are encountered during site clearing, we should

be contacted for further recommendations. All excavations should be observed by GEOMAT prior to backfill placement.

- ✦ Stripped materials consisting of vegetation and organic materials should be removed from the site or used to re-vegetate exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding five feet in height.
- ✦ Sloping areas steeper than 5:1 (horizontal:vertical) should be benched to reduce the potential for slippage between existing slopes and fills. Benches should be level and wide enough to accommodate compaction and earth-moving equipment.
- ✦ All exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of eight inches, conditioned to optimum plus three percent of optimum moisture content, and compacted to at least 95% of standard proctor (ASTM D698).

Excavation

We present the following general comments regarding our opinion of the excavation conditions for the designers' information with the understanding that they are opinions based on our boring data. More accurate information regarding the excavation conditions should be evaluated by contractors or other interested parties from test excavations using the equipment that will be used during construction. Based on our subsurface evaluation it appears that excavations in soils at the site will be possible using standard excavation equipment.

On-site soils may pump or become unstable or unworkable at high water contents, especially for excavations near the water table. Dewatering may be necessary to achieve a stable excavation. Workability may be improved by scarifying and drying. Over-excavation of wet zones and replacement with granular materials may be necessary. Lightweight excavation equipment may be required to reduce subgrade pumping.

Slab Subgrade Preparation

- ✦ After site clearing is complete, the existing soil below the building should be prepared as recommended in the [Floor Slab Design and Construction](#) and [Site Clearing](#) sections of this report.

- A minimum 4-inch layer of aggregate base course should be placed beneath interior floor slabs on grade.

Foundation Preparation

Footings should bear on engineered fill or Tensar NXF geogrid-reinforced base course as recommended in the [Foundations](#) section of this report. All loose and/or disturbed soils should either be compacted or removed from the bottoms of footing excavations prior to placement of reinforcing steel and/or concrete.

Fill Materials

Based upon the conditions encountered and tested, the native sandy soils do appear suitable for direct re-use and engineered (structural) fill. The contractor should be responsible for determining the most appropriate method (i.e. removal/replacement vs. blending) for providing the required engineered fill material prior to bidding the work. Periodic testing should be performed before and/or during construction to confirm the suitability of the native soils for use as engineered fill, if applicable.

If required native or imported soils with low expansive potentials could be used as fill material for the following, provided they meet the criteria given in this section below:

- general site grading
- foundation backfill
- exterior slab areas
- interior floor slab areas
- pavement areas

Select granular materials should be used as backfill behind walls that retain earth and should meet the specifications provided in the [Subsurface Drainage](#) section of this report.

On site, imported, or blended soils to be used in structural (engineered) fills should conform to the following:

Recommended Engineered Fill Properties

Sieve Size	Percent Finer by Weight (ASTM C136)
3" Sieve	100
No. 4 Sieve	50 – 100
No. 200 Sieve	50 Max
Plasticity Index	12 Max
Maximum Expansive Potential (%)*	1.5

* Measured on a sample compacted to approximately 95 percent of the ASTM D1557 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 144-psf surcharge and submerged.

Aggregate base course should conform to Type I or II Base Course as specified in Section 303 of the 2019 New Mexico Department of Transportation (NMDOT) "Standard Specifications for Highway and Bridge Construction."

Placement and Compaction

The following placement and compaction recommendations should be considered at minimum:

- Place and compact fill in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.
- Un-compacted fill lifts should not exceed 10 inches loose thickness.
- On-site and imported soils should be compacted at moisture contents near optimum.
- Materials should be compacted to the following:

Recommended Field Compaction

Material		Minimum Percent Compaction (ASTM D1557)
Subgrade soils beneath fill areas		95
On-site or imported soil fills:	Beneath footings, slabs on grade	95
	Aggregate base beneath slabs	95
Miscellaneous backfill		90

Subgrade soils beneath fill areas should be scarified to a minimum depth of eight inches, conditioned to optimum plus three percent of optimum moisture content, and compacted to at least 95% of standard proctor (ASTM D1557).

Compliance

Recommendations for slabs-on-grade and foundation elements supported on compacted fills depend upon compliance with [Earthwork](#) recommendations. To assess compliance, observation and testing should be performed by GEOMAT. GEOMAT cannot be held liable, in any manner, if the necessary observation and testing to confirm the conditions we have inferred to exist is not performed.

6.9 Drainage

Surface Drainage

Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. Planters and other surface features that could retain water in areas adjacent to the building or pavements should be sealed or eliminated.

In areas where sidewalks or paving do not immediately adjoin structures, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of

moisture infiltration.

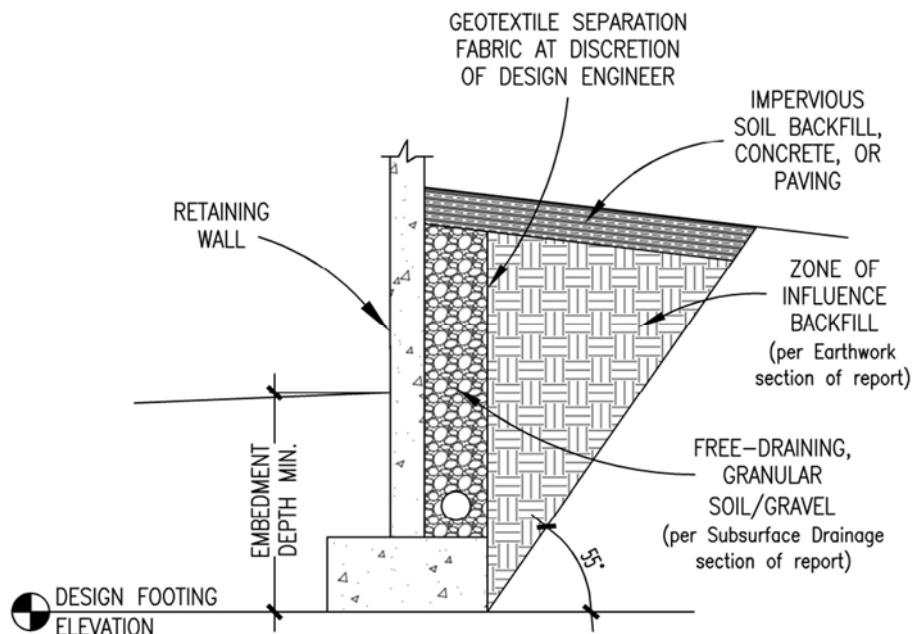
Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving.

Sprinkler systems should not be within five feet of foundation walls. Irrigated landscaping adjacent to the foundation system should be minimized or eliminated.

Subsurface Drainage

Free-draining, granular soils containing less than five percent fines (by weight) passing a No. 200 sieve should be placed for a minimum horizontal dimension of two feet directly adjacent to walls which retain earth. A woven fabric with minimum 8 ounces/square yard shall be placed between the granular layer and adjacent backfill as applicable. A drainage system consisting of either weep holes, drain mats, or perforated drain lines (placed near the base of the wall) should be used to intercept and discharge water which would tend to saturate the backfill. Where used, drain lines should be embedded in a uniformly graded filter material and provided with adequate clean-outs for periodic maintenance. An impervious soil with a minimum of 50 percent passing the No. 200 sieve and plasticity index greater than 15 should be used in the upper layer of backfill to reduce the potential for water infiltration.

A generalized depiction of a retaining wall is shown below. Actual retaining wall design is the responsibility of others.



7.0 GENERAL COMMENTS

It is recommended that GEOMAT be retained to provide a general review of final design plans and specifications in order to confirm that grading and foundation recommendations in this report have been interpreted and implemented. In the event that any changes of the proposed project are planned, the opinions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

GEOMAT should also be retained to provide services during excavation, grading, foundation, and construction phases of the work. Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present and is considered a necessary part of continuing geotechnical engineering services for the project. Construction testing, including field and laboratory evaluation of fill, backfill, pavement materials, concrete and steel should be performed to determine whether applicable project requirements have been met.

The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the location of test borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities at the same time. No warranty, express or implied, is intended or made. We prepared the report as an aid in design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction equipment and techniques to be used on this project.

This report is for the exclusive purpose of providing geotechnical engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed any geologic hazards that may exist on or near the site.

This report may be used only by the Client and only for the purposes stated, within a reasonable

time from its issuance. Land use, site conditions (both on and off site), or other factors may change over time and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify GEOMAT in writing of such intended use. Based on the intended use of the report, GEOMAT may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements, by the Client or anyone else, will release GEOMAT from any liability resulting from the use of this report by an unauthorized party.

Appendix A



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PREPARED BY
GEOMAT Inc.
Albuquerque, New Mexico

PROJECT
Name: Tamaya Residences
Number: 252-5484A

LOCATION
Pueblo of Santa Ana, New Mexico
35.42861, -106.61851

SYMBOL KEY
Soil Boring



7901 Lorraine Court NE
Albuquerque, New Mexico
Office: (505)300-5816

Tamaya Residences

Lat/Lon: 35.428626/-106.618472

SOIL BORING: B-1

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5248'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	~ 19' At Time of Drilling
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	North Side Robbins Residence
Hammer Drop:	30 inches		

Lab				Samples			USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type	Sample Graphic				
106.0	32	NP	5.0	5-2-2	Bulk	SM		1	Silty SAND, brown, fine- to coarse-grained, very loose, damp	
					SS					2
					Ring					3
										4
108.1			8.5	4-3-3	SS	SP		5	Poorly Graded SAND, brown, fine- to coarse-grained, very loose, damp to moist, with interbedded clay lenses	
					Ring					6
				1-1-1	SS					7
										8
					Ring					9
										10
				2-3-4						11
										12
										13
										14
4-7-11	SS		15							
			16							
			17							
			18							
				3-3-4	Ring			19	auger chatter gravel 12' to 12.5'	
							20			
							21			
Total depth 21½ feet										21.5

	SM		SS	-
	SP		Bulk	-
			Ring	-



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Tamaya Residences

Lat/Lon: 35.428577/-106.618606

SOIL BORING: B-2

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5246'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	~ 16' At Time of Drilling
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	West Side Robbins Residence
Hammer Drop:	30 inches		

Lab				Samples			USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type	Sample Graphic				
96.2			9.3	3-4-4			SM		1	Silty SAND, brown, fine- to coarse-grained, very loose, damp to moist
					Grab				2	
					Ring				3	
				3-2-2			SP		4	Poorly Graded SAND, brown, fine- to coarse-grained, very loose, damp to moist, with interbedded clay lenses
					SS				5	
									6	
				2-3-4					7	
					Ring				8	
									9	
				1-2-2					10	
					SS				11	
									12	
				2-2-7					13	
					Ring				14	
									15	
2-1-1			16	auger chatter grinding on cobbles 12' to 13'						
			17							
			18							
			19							
			20	auger chatter, gravel and cobbles 16' to 17'						
SS		21								
Total depth 21½ feet										21.5

At Time of Drilling (ATD)	SP	Ring	-
SM	Grab - Grab Sample	SS	-



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Tamaya Residences

Lat/Lon: 35.428461/-106.618563

SOIL BORING: B-3

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5248'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	~20' At Time of Drilling
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	South Side Robbins Residence
Hammer Drop:	30 inches		

Lab				Samples			USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type	Sample Graphic				
104.8			5.7	1-1-2	SS Grab		SM		1	Silty SAND, brown, fine- to medium-grained, very loose, damp to moist dark brown
									2	
									3	
				2-4-5	Ring				4	
									5	
									6	
				2-3-4	SS				7	Poorly Graded SAND, brown/dark brown, fine- to coarse-grained, very loose, damp to moist, with interbedded clay lenses loose
									8	
									9	
				5-8-5	Ring				10	
									11	
									12	
				8-17-27			SP		13	chatter and grinding on cobbles and gravel dense, Cobbles and gravel 15' to 20'
									14	
SS		15								
		16								
		17								
1-3-6					18	very loose, with gravel, wet				
					19					
	Ring				20					
					21					
Total depth 21½ feet										21.5

At Time of Drilling (ATD)	SM	Grab	-
SP	SS	Ring	-



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Tamaya Residences

Lat/Lon: 35.428497/-106.618454

SOIL BORING: B-4

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5250'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	Not Encountered
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	East Side Robbins Residence
Hammer Drop:	30 inches		

Lab				Samples			USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type	Sample Graphic				
100.3	20	NP	6.6	4-5-9	Ring		SM		1	Silty SAND, brown, fine- to coarse-grained, loose, damp
									2	
									3	
							SP		4	very dense
	27	NP		2-22-30	SS				5	
									6	
									7	Poorly Graded SAND, brown, very dense, damp to moist, with gravel and interbedded clay lenses
									8	
									9	
105.1			5.6	5-17-20	Ring				10	very dense
									11	
				6-12-17	SS				12	
									13	Clay lenses 12' to 14'
									14	
									15	
				10-25-30	Ring				16	Cobbles 14' to 19'
									17	
									18	
									19	auger chatter from cobbles
									20	
				3-5-6	SS				21	
										very loose
										6.0
										21.5
Total depth 21½ feet										
	SM				SP				Ring	
									SS	



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Tamaya Residences

Lat/Lon: 35.428131/-106.618232

SOIL BORING: B-5

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5252'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	Not Encountered
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	North Side Armijo, Ortiz, Garcia Residences
Hammer Drop:	30 inches		

Lab				Samples			USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks	
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type	Sample Graphic					
105.9	18	NP	4.3	3-3-3			SM		1	Silty SAND, brown, fine- to medium-grained, loose, damp very loose 7.0	
					Bulk				2		
					SS				3		
					Ring				4		
103.3	16	NP	6.5	3-3-3			SP		5	Poorly Graded SAND, light brown/brown, fine- to coarse-grained, loose, damp to moist, with interbedded clay lenses loose dense brown, medium dense, with gravel 21.5	
					Ring				6		
				3-5-5	SS				7		
									8		
				4-3-5	Ring				9		
									10		
				6-8-6	SS				11		
									12		
5-19-30	Ring		13								
			14								
			15								
Total depth 21½ feet											
 SP						 SS - 2" Split Spoon			 Bulk - Bulk Sample		-
 SM						 Ring - Lined Barrel Sampler			-		-



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Tamaya Residences

Lat/Lon: 35.428083/-106.618158

SOIL BORING: B-6

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5253'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	Not Encountered
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	North Side Armijo, Ortiz, Garcia Residences
Hammer Drop:	30 inches		

Lab				Samples			USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks								
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type	Sample Graphic												
103.3			14.8	3-3-5	Grab		SM		1	Silty SAND, brown, fine- to medium-grained, very loose to loose, damp								
					Ring			2										
								3										
				1-1-2	SS			4										
								5										
								6										
				4-5-8	Ring		SP	7	Poorly Graded SAND, brown, fine- to coarse-grained, very loose, damp, with interbedded clay lenses with interbedded clay lenses, light brown/brown, loose									
								8										
								9										
				2-2-3	SS			10										
								11										
								12										
				6-6-7	Ring			13										
								14										
								15										
5-7-3				5-7-3	SS			16	clay lenses 12½' to 21½' dense auger chatter 16½' to 17½' cobbles and gravel									
								17										
								18										
								19										
								20										
								21										
Total depth 21½ feet																		
SP					Ring - Lined Barrel Sampler			Grab - Grab Sample		-								
SM					SS - 2" Split Spoon			-		-								



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Tamaya Residences

Lat/Lon: 35.427980/-106.618314

SOIL BORING: B-7

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5250'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	~20' At Time of Drilling
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	South Side Armijo, Ortiz, Garcia Residences
Hammer Drop:	30 inches		

Lab				Samples		USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks			
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type					Sample Graphic		
105.9			7.4	1-2-3	Grab	SP-SM		1	Poorly Graded SAND with silt, brown to gray, fine- to medium-grained, loose, damp			
					SS			2		brown, with gravel		
								Ring			3	
											4	
				2-2-2	SS			Ring	5	very loose		
									6			
				1-2-3	SS			Ring	7	brown/dark brown, loose damp to moist		
									8			
				5-11-15	Ring	SP		9	Poorly Graded SAND, brown, medium dense, damp to moist, with interbedded clay lenses auger grinding 9' to 12'			
								10				
								11				
								12				
				3-14-13	SS			13	cobbles and gravel Clay balling 14' to 18'			
								14				
								15				
								16				
				2-3-3	Ring			17	wet			
								18				
								19				
								20				
										21		
Total depth 21½ feet												
-								SP-SM		Ring - Lined Barrel Sampler		-
SP								SS - 2" Split Spoon		-		-



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Tamaya Residences

Lat/Lon: 35.427921/-106.618179

SOIL BORING: B-8

Project Name:	Tamaya Residences	Date Drilled:	07/28/2025
Project Number:	252-5484A	Location Accuracy:	Estimated from Google Maps
Client:	John Barton Architects	Elevation:	~5249'
Project Location:	Pueblo of Santa Ana, New Mexico	Hole Location:	See Site Plan
Rig Type:	CME-75	Groundwater depth:	~18' At Time of Drilling
Tooling:	7-1/4" Hollow Stem Auger	Logged By:	EN
Hammer Weight:	140 lbs	Comments:	South Side Armijo, Ortiz, Garcia Residences
Hammer Drop:	30 inches		

Lab				Samples			USCS	Soil Graphic	Depth (ft)	Soil Description and Remarks
Dry Density (PCF)	Percent Passing #200	Plasticity Index	Moisture Content (%)	Blow Counts/6"	Sample Type	Sample Graphic				
114.0	11	NP	5.8	2-5-5	Ring		SP-SM		1	Poorly Graded SAND with silt, brown, fine- to coarse-grained, very loose, slightly damp
									2	
									3	
				1-2-3	SS				4	
									5	
118.0			2.8	2-2-4	Ring		SP		6	
									7	
				5-10-1	SS				8	
									9	
				7-17-18	Ring				10	
									11	
									12	
									13	
1-1-3			14							
			15							
			16							
	SS		17							
Total depth 21½ feet										7.0
										21.5

At Time of Drilling (ATD)	SP-SM	SS - 2" Split Spoon	-
SP	Ring - Lined Barrel Sampler	-	-

UNIFIED SOIL CLASSIFICATION SYSTEM						CONSISTENCY OR RELATIVE DENSITY CRITERIA						
Major Divisions				Group Symbols	Typical Names							
C - G  More than 50% retained on No. 200 sieve	G  50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines		S P T  Density of Granular Soils			R -L S  Density of Granular Soils			
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines								Penetration Resistance, N (blows/ft.) Relative Density
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures		0-4 Very Loose						
			GC	Clayey gravels, gravel-sand-clay mixtures					5-10 Loose			
	S  More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines		11-30 Medium Dense						
			SP	Poorly graded sands and gravelly sands, little or no fines					27-74 Medium Dense			
		Sands with Fines	SM	Silty sands, sand-silt mixtures		31-50 Dense						
			SC	Clayey sands, sand-clay mixtures					75-120 Dense			
					Standard Penetration Test Density of Fine-Grained Soils			Ring-Lined Sampler Density of Fine-Grained Soils				
	F -G  S  50% or more passes No. 200 sieve	S   C  Liquid Limit 50 or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands		Penetration Resistance, N (blows/ft.) Consistency			Unconfined Compressive Strength (Tons/ft2)		
CL				Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		<2 Very Soft <0.25			<3 Very Soft <0.25			
OL				Organic silts and organic silty clays of low plasticity								
S   C  Liquid Limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous free sands or silts, elastic silts		2-4 Soft 0.25-0.50			3-6 Soft 0.25-0.50				
		CH	Inorganic clays of high plasticity, fat clays		5-8 Medium Stiff 0.50-1.00			7-12 Medium Stiff 0.50-1.00				
		OH	Organic clays of medium to high plasticity		9-15 Stiff 1.00-2.00			13-25 Stiff 1.00-2.00				
						16-30 Very Stiff 2.00-4.00			26-65 Very Stiff 2.00-4.00			
Highly Organic Soils			PT	Peat, mucic & other highly organic soils		>50 Very Dense			>120 Very Dense			
						Standard Penetration Test Density of Fine-Grained Soils			Ring-Lined Sampler Density of Fine-Grained Soils			
						Penetration Resistance, N (blows/ft.) Consistency			Unconfined Compressive Strength (Tons/ft2)			
						<2 Very Soft <0.25			<3 Very Soft <0.25			
						2-4 Soft 0.25-0.50			3-6 Soft 0.25-0.50			
						5-8 Medium Stiff 0.50-1.00			7-12 Medium Stiff 0.50-1.00			
						9-15 Stiff 1.00-2.00			13-25 Stiff 1.00-2.00			
						16-30 Very Stiff 2.00-4.00			26-65 Very Stiff 2.00-4.00			
						>30 Hard >4.0			>65 Hard >4.0			
U.S. Standard Sieve Sizes												
>12" 12" 3" 3/4" #4 #10 #40 #200												
Boulders		Cobbles		Gravel		Sand			Silt or Clay			
		coarse fine		coarse medium fine								

MOISTURE CONDITIONS

Dry	Absence of moist, dusty, dry to the touch
Slightly Damp	Below optimum moisture content for compaction
Moist	Near optimum moisture content, will moisten the hand
Very Moist	Above optimum moisture content
Wet	Visible free water, below water table

MATERIAL QUANTITY

trace	0-5%
few	5-10%
little	10-25%
some	25-45%
mostly	50-100%

OTHER SYMBOLS

R	Ring Sample
S	SPT Sample
B	Bulk Sample
▼	Ground Water

BASIC LOG FORMAT:

SOILS - Group name, Group symbol, color, consistency or relative density, grain size, moisture. Additional comments: odor, presence of roots, mica, gypsum, coarse particles, etc.

ROCK - Name, color, planing, porosity, moisture, weathering, relative strength, additional comments.

EXAMPLES:

SILTY SAND w/trace silt (SM-SP), Brown, loose to med. Dense, fine to medium grained, damp

BASALT, gray/black, irregular planes, porous, slightly damp, slightly weathered, medium strong (R3)

UNIFIED SOIL CLASSIFICATION SYSTEM

TEST DRILLING EQUIPMENT & PROCEDURES

Description of Subsurface Exploration Methods

Drilling Equipment – Truck-mounted drill rigs powered with gasoline or diesel engines are used in advancing test borings. Drilling through soil or softer rock is performed with hollow-stem auger or continuous flight auger. Carbide insert teeth are normally used on bits to penetrate soft rock or very strongly cemented soils which require blasting or very heavy equipment for excavation. Where refusal is experienced in auger drilling, the holes are sometimes advanced with tricone gear bits and NX rods using water or air as a drilling fluid.

Coring Equipment – Portable electric core drills are used when recovery of asphalt or concrete cores is necessary. The core drill is equipped with either a 4” or 6” diameter diamond core barrel. Water is generally used as a drilling fluid to facilitate cooling and removal of cuttings from the annulus.

Sampling Procedures - Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In most cases, 2” outside diameter, 1 3/8” inside diameter, samplers are used to obtain the standard penetration resistance. “Undisturbed” samples of firmer soils are often obtained with 3” outside diameter samplers lined with 2.42” inside diameter brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samplers in 6-inch increments. These values are expressed in blows per foot on the boring logs. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. “Undisturbed” sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Where samples of rock are required, they are obtained by NX diamond core drilling (ASTM D2113).

Boring Records - Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the logs.

Appendix B

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	SIEVE ANALYSIS, CUMULATIVE PERCENT PASSING (%)												ATTERBERG LIMITS			CONSOLIDATION	IN-SITU			CLASSIFICATION
			¾"	½"	⅜"	No. 4	No. 8	No. 10	No. 16	No. 30	No. 40	No. 50	No. 100	No. 200	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX		MOISTURE CONTENT (%)	WET DENSITY (pcf)	DRY DENSITY (pcf)	
30432	B-1	5	100	100	100	98	97	96	94	91	86	79	55	32	NLL	NPL	NP	Attached	5.0	111.3	106.0	Silty SAND (SM)
30433	B-1	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.5	117.3	108.1	Poorly Graded SAND (SP)
30434	B-2	2 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.3	105.1	96.2	Silty SAND (SM)
30435	B-3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	110.8	104.8	Silty SAND (SM)
30436	B-4	2 ½	100	100	100	100	100	100	100	99	97	91	56	20	NLL	NPL	NP	Attached	6.6	106.9	100.3	Silty SAND (SM)
30437	B-4	5	-	-	-	-	-	-	-	-	-	-	-	27	NLL	NPL	NP	-	-	-	-	Silty SAND (SM)
30438	B-4	7 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.6	111.0	105.1	Clayey SAND (SC)
30440	B-5	5	100	100	99	96	92	91	88	82	76	64	38	18	NLL	NPL	NP	Attached	4.3	110.5	105.9	Silty SAND (SM)
30441	B-5	10	-	-	-	-	-	-	-	-	-	-	-	16	NLL	NPL	NP	-	6.5	110.0	103.3	Silty SAND (SM)
30442	B-6	7 ½	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.8	118.6	103.3	Poorly Graded SAND (SP)
30443	B-7	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7.4	113.7	105.9	Poorly Graded SAND with silt (SP-SM)
30444	B-8	2 ½	100	99	99	90	78	75	68	59	52	42	23	11	NLL	NPL	NP	Attached	5.8	120.6	114.0	Poorly Graded SAND with silt (SP-SM)
30445	B-8	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.8	121.3	118.0	Poorly Graded SAND (SP)
			SUMMARY OF SOIL TESTS Page 1 of 1												Project Name			Tamaya Residences				
															Project No.			252-5484A				
															Location			Pueblo of Santa Ana, New Mexico				
															Date(s) of Exploration			7/28/2025				

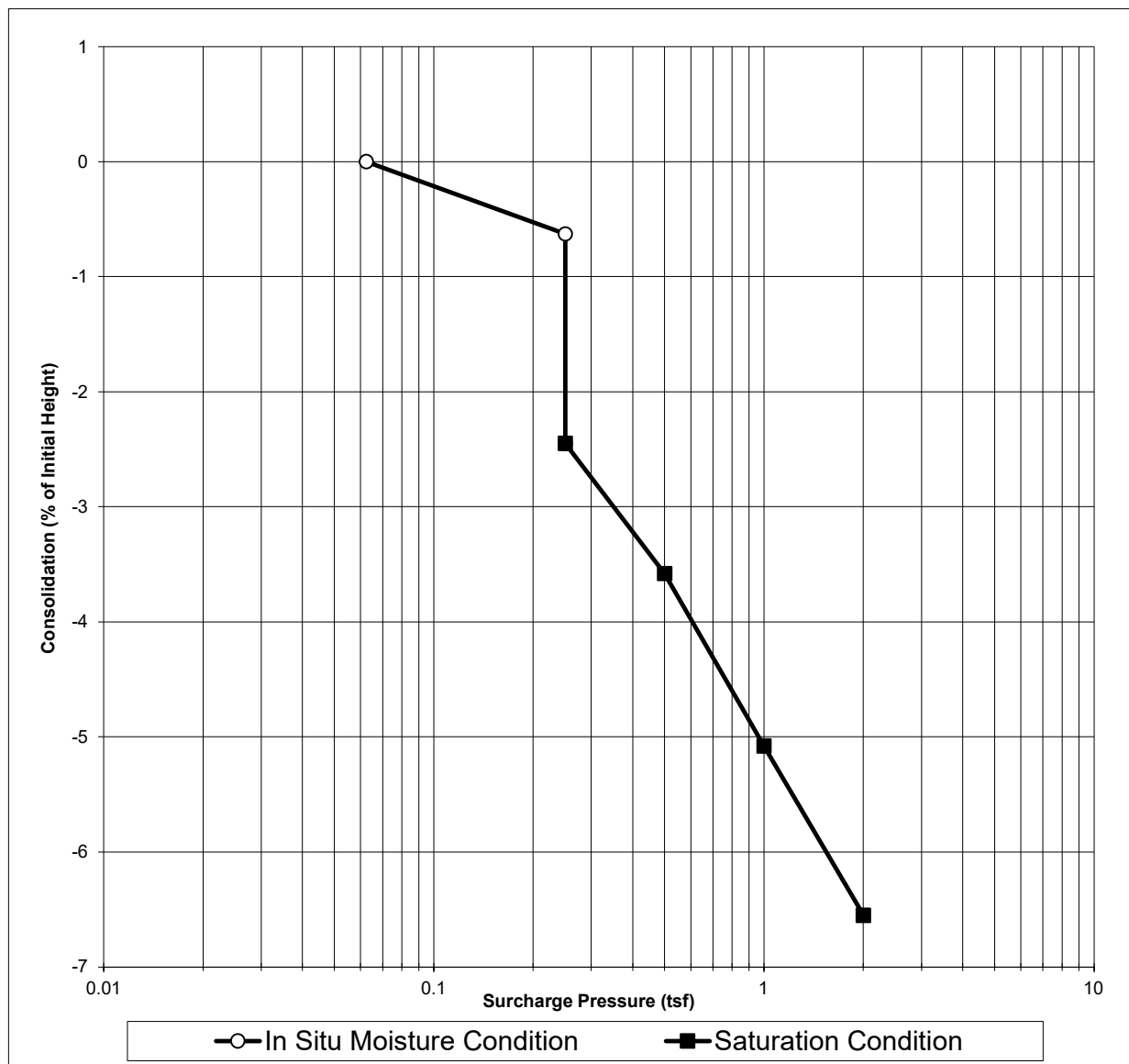
NLL = No Liquid Limit
NPL = No Plastic Limit
NP = Non-Plastic

PROJECT: Tamaya Residences
CLIENT: John Barton Architects, LLC
MATERIAL: Silty SAND (SM)
SAMPLE SOURCE: B-1 @ 5'
SAMPLE PREP.: In Situ

JOB NO: 252-5484A
WORK ORDER NO: N/A
LAB NO: 30432
DATE SAMPLED: 7/28/2025
SAMPLED BY: EN

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.30
INITIAL MOISTURE CONTENT	5.0%	FINAL MOISTURE CONTENT	17.3%
INITIAL DRY DENSITY(pcf)	106.0	FINAL DRY DENSITY(pcf)	112.9
INITIAL DEGREE OF SATURATION	17%	FINAL DEGREE OF SATURATION	68%
INITIAL VOID RATIO	0.57	FINAL VOID RATIO	0.47
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf

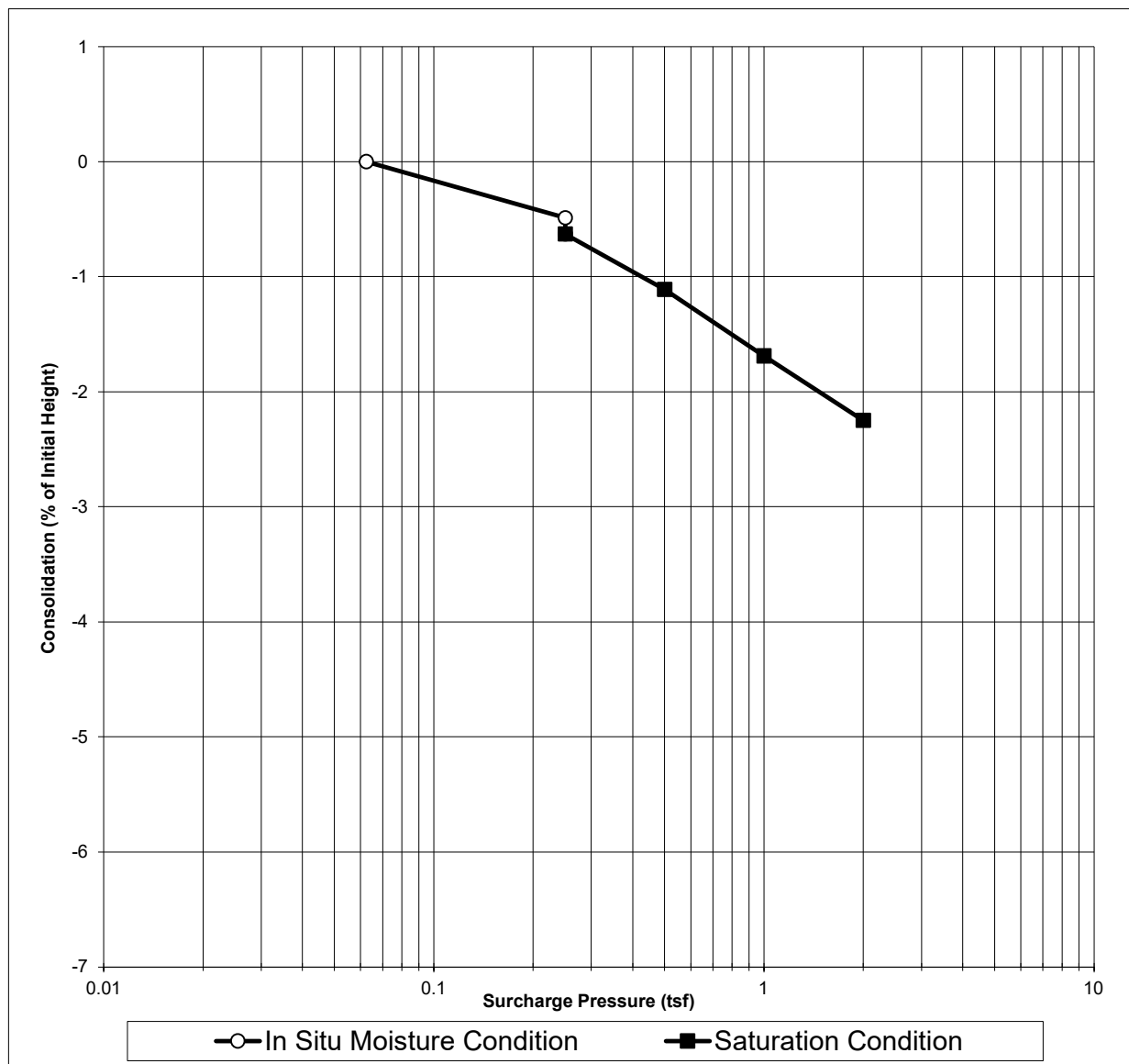


PROJECT: Tamaya Residences
CLIENT: John Barton Architects, LLC
MATERIAL: Silty SAND (SM)
SAMPLE SOURCE: B-4 @ 2½'
SAMPLE PREP.: In Situ

JOB NO: 252-5484A
WORK ORDER NO: N/A
LAB NO: 30436
DATE SAMPLED: 7/28/2025
SAMPLED BY: EN

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.50
INITIAL MOISTURE CONTENT	6.6%	FINAL MOISTURE CONTENT	17.2%
INITIAL DRY DENSITY(pcf)	100.3	FINAL DRY DENSITY(pcf)	102.1
INITIAL DEGREE OF SATURATION	20%	FINAL DEGREE OF SATURATION	55%
INITIAL VOID RATIO	0.66	FINAL VOID RATIO	0.62
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf

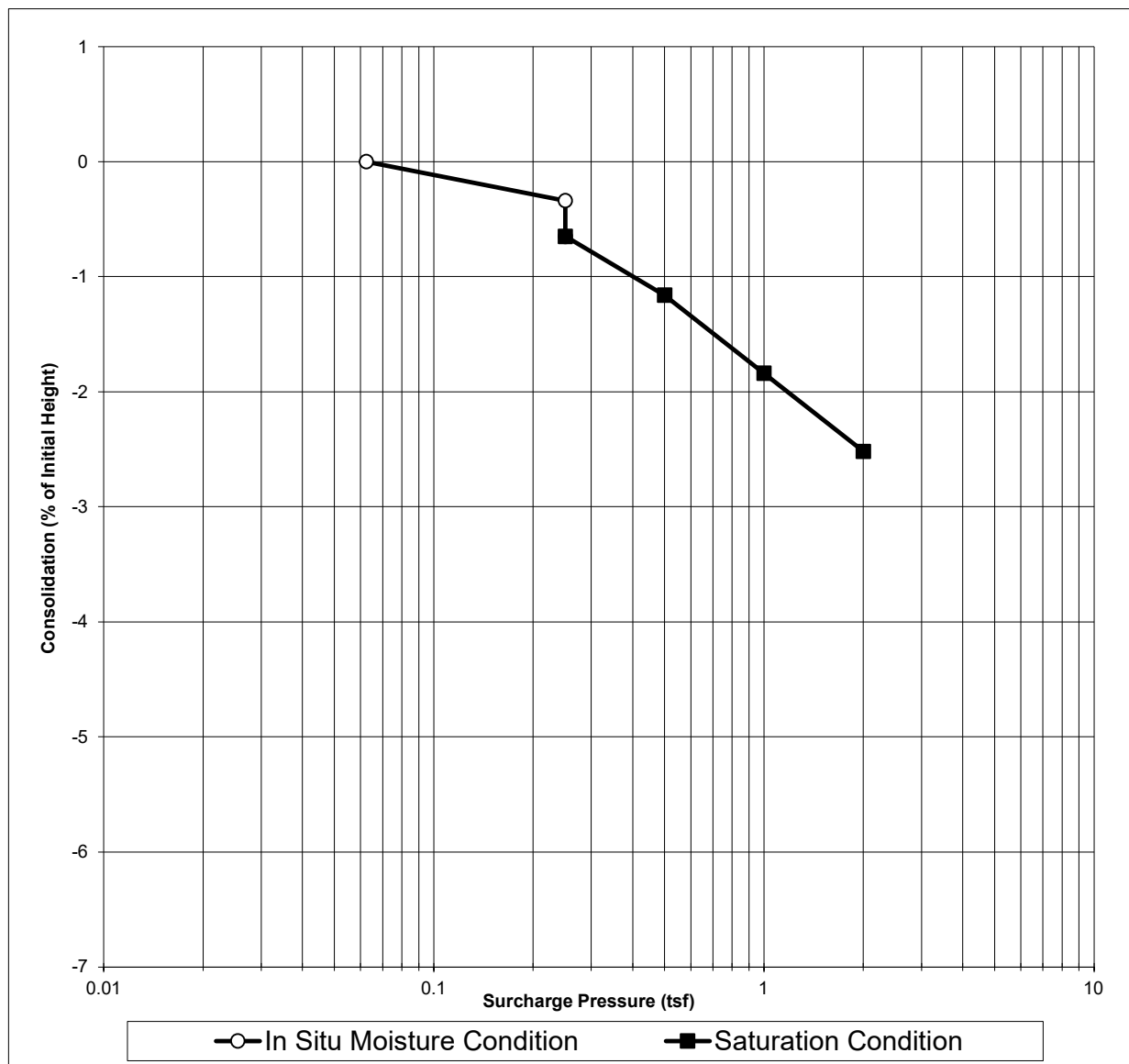


PROJECT: Tamaya Residences
CLIENT: John Barton Architects, LLC
MATERIAL: Silty SAND (SM)
SAMPLE SOURCE: B-5 @ 5'
SAMPLE PREP.: In Situ

JOB NO: 252-5484A
WORK ORDER NO: N/A
LAB NO: 30440
DATE SAMPLED: 7/28/2025
SAMPLED BY: EN

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.49
INITIAL MOISTURE CONTENT	4.3%	FINAL MOISTURE CONTENT	19.6%
INITIAL DRY DENSITY(pcf)	105.9	FINAL DRY DENSITY(pcf)	108.1
INITIAL DEGREE OF SATURATION	15%	FINAL DEGREE OF SATURATION	70%
INITIAL VOID RATIO	0.57	FINAL VOID RATIO	0.53
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf

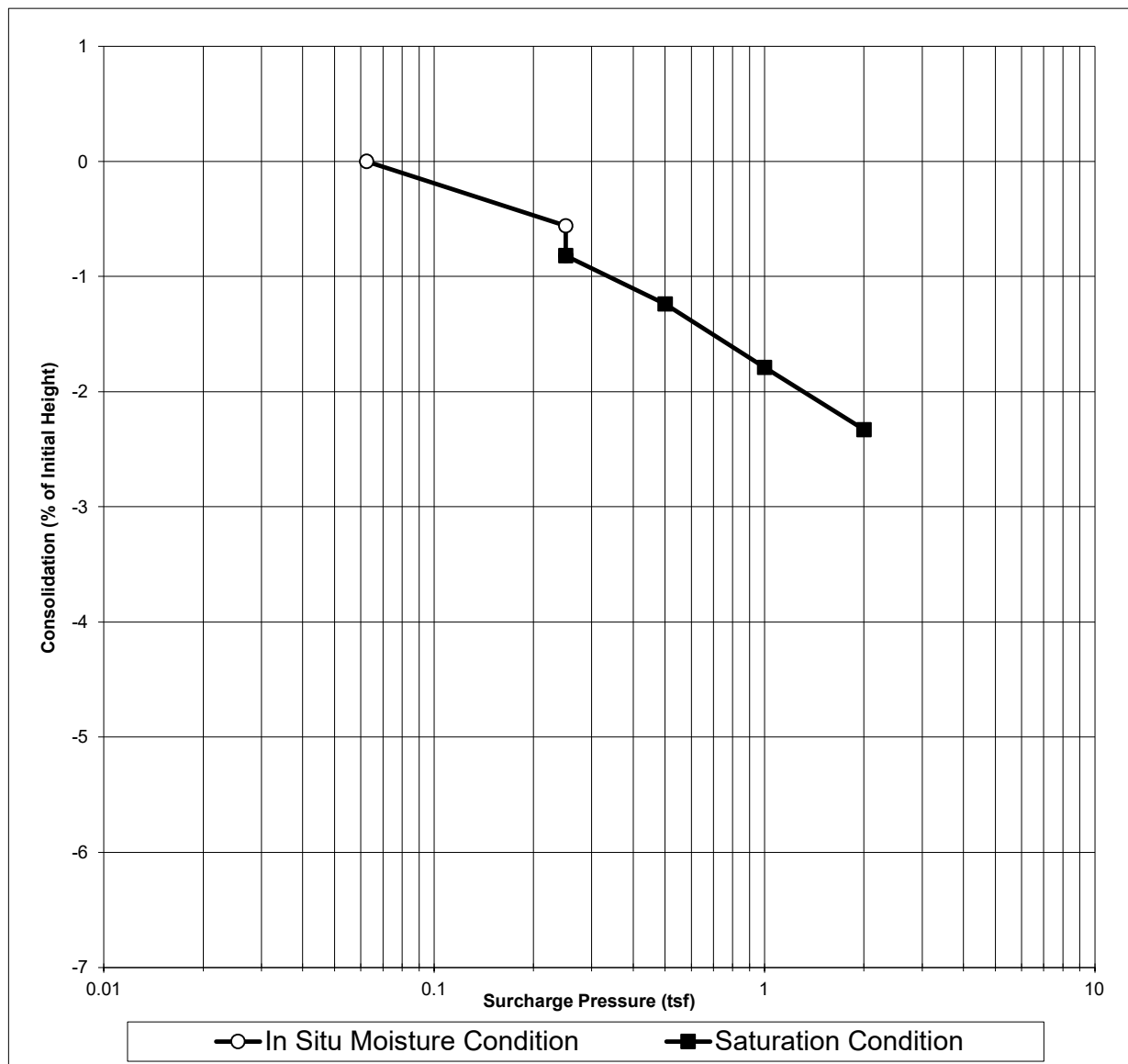


PROJECT: Tamaya Residences
CLIENT: John Barton Architects, LLC
MATERIAL: Poorly Graded SAND with silt (SP-SM)
SAMPLE SOURCE: B-8 @ 2½'
SAMPLE PREP.: In Situ

JOB NO: 252-5484A
WORK ORDER NO: N/A
LAB NO: 30444
DATE SAMPLED: 7/28/2025
SAMPLED BY: EN

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS (ASTM D2435)

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.50
INITIAL MOISTURE CONTENT	5.8%	FINAL MOISTURE CONTENT	16.2%
INITIAL DRY DENSITY(pcf)	114.0	FINAL DRY DENSITY(pcf)	116.2
INITIAL DEGREE OF SATURATION	24%	FINAL DEGREE OF SATURATION	68%
INITIAL VOID RATIO	0.46	FINAL VOID RATIO	0.42
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf



LABORATORY TESTING PROCEDURES

Laboratory testing is performed by trained personnel in our accredited laboratory or may be subcontracted by GEOMAT through a qualified outside laboratory if necessary. Actual types and quantities of tests performed for any project will be dependent upon subsurface conditions encountered and specific design requirements.

The following is an abbreviated table of laboratory testing that may be performed by GEOMAT with the applicable standards listed. Testing for a specific project may include all or a selected subset of the laboratory work listed. Laboratory testing beyond those listed may be available and could be incorporated into the project scope at the discretion of GEOMAT.

PROCEDURE	ASTM	AASHTO
Moisture Content	D2216	T 265
Sieve Analysis	C136	T 27
Fines Content	D1140	T 11
Hydrometer	D7928	T 88
Atterberg Limits	D4318	T 89/T 90
Water Soluble Sulfate	C1580	T 290
pH of Soil for Use in Corrosion Testing	G51	T 289
Soil Resistivity Using 2-Electrode Soil Box Method	G187	T 288
Carbonate Content	D4373	-
Soil Compression/Expansion	D2435	T 216
Soil Classification	D2487	M 145
Direct Shear	D3080	T 236
Unconfined Compressive Strength of Soils	D2166	T 208
Unconfined Compressive Strength of Rock Cores	D4543	-

Appendix C

Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer

will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the “Findings” Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site’s subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual site-wide subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report’s Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals’ misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals’ plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*

conspicuously that you’ve included the material for information purposes only. To avoid misunderstanding, you may also want to note that “informational purposes” means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled “limitations,” many of these provisions indicate where geotechnical engineers’ responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a “phase-one” or “phase-two” environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer’s services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, *proper implementation of the geotechnical engineer’s recommendations will not of itself be sufficient to prevent moisture infiltration.* Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. *Geotechnical engineers are not building-envelope or mold specialists.*



GEOPROFESSIONAL
BUSINESS
ASSOCIATION

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THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A201

General Conditions of the Contract for Construction

*THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES; CONSULTATION
WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS MODIFICATION*

1976 EDITION TABLE OF ARTICLES

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| 3. OWNER | 10. PROTECTION OF PERSONS AND
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This document has been approved and endorsed by The Associated General Contractors of America.

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GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

ARTICLE 1

CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, and all Addenda issued prior to and all 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 written interpretation issued by the Architect pursuant to Subparagraph 2.2.8, or (4) a written order for a minor change in the Work issued by the Architect pursuant to Paragraph 12.4. The Contract Documents do not include Bidding Documents such as the Advertisement or Invitation to Bid, the Instructions to Bidders, sample forms, the Contractor's Bid or portions of Addenda relating to any of these, or any other documents, unless specifically enumerated in the Owner-Contractor Agreement.

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect and the Contractor, but the Architect shall be entitled to performance of obligations intended for his benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Architect and any Subcontractor or Sub-subcontractor.

1.1.3 THE WORK

The Work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

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.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed in not less than triplicate by the Owner and Contractor. If either the Owner or the Contractor or both do not sign the Conditions of the Contract, Drawings, Specifications, or any of the other Contract Documents, the Architect shall identify such Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2.4 The organization of the Specifications into divisions, sections and articles, and the 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.

1.3 OWNERSHIP AND USE OF DOCUMENTS

1.3.1 All Drawings, Specifications and copies thereof furnished by the Architect are and shall remain his property. They are to be used only with respect to this Project and are not to be used on any other project. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Architect on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's common law copyright or other reserved rights.

ARTICLE 2

ARCHITECT

2.1 DEFINITION

2.1.1 The Architect is the person lawfully licensed to practice architecture, or an entity lawfully practicing architecture identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect means the Architect or his authorized representative.

2.2 ADMINISTRATION OF THE CONTRACT

2.2.1 The Architect will provide administration of the Contract as hereinafter described.

2.2.2 The Architect will be the Owner's representative during construction and until final payment is due. The Architect will advise and consult with the Owner. The Owner's instructions to the Contractor shall be forwarded

through the Architect. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with Subparagraph 2.2.18.

2.2.3 The Architect will visit the site at intervals appropriate to the stage of construction to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding 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. On the basis of his on-site observations as an architect, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.

2.2.4 The Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

2.2.5 The Architect shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Architect may perform his functions under the Contract Documents.

2.2.6 Based on the Architect's observations and an evaluation of the Contractor's Applications for Payment, the Architect will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.

2.2.7 The Architect will be the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by both the Owner and Contractor.

2.2.8 The Architect will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make written request to the Architect for such interpretations.

2.2.9 Claims, disputes and other matters in question between the Contractor and the Owner relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred initially to the Architect for decision which he will render in writing within a reasonable time.

2.2.10 All interpretations and decisions of the Architect shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. In his capacity as interpreter and judge, he will endeavor to secure faithful performance by both the Owner and the Contractor, will not

show partiality to either, and will not be liable for the result of any interpretation or decision rendered in good faith in such capacity.

2.2.11 The Architect's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

2.2.12 Any claim, dispute or other matter in question between the Contractor and the Owner referred to the Architect, except those relating to artistic effect as provided in Subparagraph 2.2.11 and except those which have been waived by the making or acceptance of final payment as provided in Subparagraphs 9.9.4 and 9.9.5, shall be subject to arbitration upon the written demand of either party. However, no demand for arbitration of any such claim, dispute or other matter may be made until the earlier of (1) the date on which the Architect has rendered a written decision, or (2) the tenth day after the parties have presented their evidence to the Architect or have been given a reasonable opportunity to do so, if the Architect has not rendered his written decision by that date. When such a written decision of the Architect states (1) that the decision is final but subject to appeal, and (2) that any demand for arbitration of a claim, dispute or other matter covered by such decision must be made within thirty days after the date on which the party making the demand receives the written decision, failure to demand arbitration within said thirty days' period will result in the Architect's decision becoming final and binding upon the Owner and the Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede any arbitration proceedings unless the decision is acceptable to all parties concerned.

2.2.13 The Architect will have authority to reject Work which does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.7.2 whether or not such Work be then fabricated, installed or completed. However, neither the Architect's authority to act under this Subparagraph 2.2.13, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

2.2.14 The Architect will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

2.2.15 The Architect will prepare Change Orders in accordance with Article 12, and will have authority to order minor changes in the Work as provided in Subparagraph 12.4.1.

2.2.16 The Architect will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of Paragraph 9.9.

2.2.17 If the Owner and Architect agree, the Architect will provide one or more Project Representatives to assist the Architect in carrying out his responsibilities at the site. The duties, responsibilities and limitations of authority of any such Project Representative shall be as set forth in an exhibit to be incorporated in the Contract Documents.

2.2.18 The duties, responsibilities and limitations of authority of the Architect as the Owner's representative during construction as set forth in the Contract Documents will not be modified or extended without written consent of the Owner, the Contractor and the Architect.

2.2.19 In case of the termination of the employment of the Architect, the Owner shall appoint an architect against whom the Contractor makes no reasonable objection whose status under the Contract Documents shall be that of the former architect. Any dispute in connection with such appointment shall be subject to arbitration.

ARTICLE 3

OWNER

3.1 DEFINITION

3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or his authorized representative.

3.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

3.2.1 The Owner shall, at the request of the Contractor, at the time of execution of the Owner-Contractor Agreement, furnish to the Contractor reasonable evidence that he has made financial arrangements to fulfill his obligations under the Contract. Unless such reasonable evidence is furnished, the Contractor is not required to execute the Owner-Contractor Agreement or to commence the Work.

3.2.2 The Owner shall furnish all surveys describing the physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

3.2.3 Except as provided in Subparagraph 4.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

3.2.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

3.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the Work.

3.2.6 The Owner shall forward all instructions to the Contractor through the Architect.

3.2.7 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Work by Owner or by Separate Contractors, Payments and Completion, and Insurance in Articles 6, 9 and 11 respectively.

3.3 OWNER'S RIGHT TO STOP THE WORK

3.3.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2 or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any 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 Subparagraph 6.1.3.

3.4 OWNER'S RIGHT TO CARRY OUT THE WORK

3.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within seven days 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, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy he may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and the amount charged to the Contractor are both subject to the prior approval of the Architect. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Architect any error, inconsistency or omission he may discover. The Contractor shall not be liable to the Owner or

the Architect for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the Work at any time without Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Architect in his administration of the Contract, or by inspections, tests or approvals required or performed under Paragraph 7.7 by persons other than the Contractor.

4.4 LABOR AND MATERIALS

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

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

4.5 WARRANTY

4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Paragraph 13.2.

4.6 TAXES

4.6.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time bids are received, whether or not yet effective.

4.7 PERMITS, FEES AND NOTICES

4.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and for all other permits and governmental

fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required at the time the bids are received.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.

4.7.3 It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Architect in writing, and any necessary changes shall be accomplished by appropriate Modification.

4.7.4 If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect, he shall assume full responsibility therefor and shall bear all costs attributable thereto.

4.8 ALLOWANCES

4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.8.2 Unless otherwise provided in the Contract Documents:

- .1** these allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and all applicable taxes;
- .2** the Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance;
- .3** whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

4.9 SUPERINTENDENT

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed on written request in each case.

4.10 PROGRESS SCHEDULE

4.10.1 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information an estimated progress sched-

ule for the Work. The progress schedule 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.

4.11 DOCUMENTS AND SAMPLES AT THE SITE

4.11.1 The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Architect and shall be delivered to him for the Owner upon completion of the Work.

4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

4.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

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

4.12.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

4.12.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data or Samples under Subparagraph 2.2.14 unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's approval thereof.

4.12.7 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Architect on previous submittals.

4.12.8 No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Architect as provided in Subparagraph 2.2.14. All such

portions of the Work shall be in accordance with approved submittals.

4.13 USE OF SITE

4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.

4.14 CUTTING AND PATCHING OF WORK

4.14.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly.

4.14.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Contractor shall not unreasonably withhold from the Owner or any separate contractor his consent to cutting or otherwise altering the Work.

4.15 CLEANING UP

4.15.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.

4.15.2 If the Contractor fails to clean up at the completion of the Work, the Owner may do so as provided in Paragraph 3.4 and the cost thereof shall be charged to the Contractor.

4.16 COMMUNICATIONS

4.16.1 The Contractor shall forward all communications to the Owner through the Architect.

4.17 ROYALTIES AND PATENTS

4.17.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Architect.

4.18 INDEMNIFICATION

4.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom,

and (2) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph 4.18.

4.18.2 In any and all claims against the Owner or the Architect or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

4.18.3 The obligations of the Contractor under this Paragraph 4.18 shall not extend to the liability of the Architect, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, his agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITION

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

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

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

5.2.1 Unless otherwise required by the Contract Documents or the Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner and the Architect in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any

such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner or the Architect has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

5.2.3 If the Owner or the Architect has reasonable objection to any such proposed person or entity, the Contractor shall submit a substitute to whom the Owner or the Architect has no reasonable objection, and the Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued; however, no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsibly in submitting names as required by Subparagraph 5.2.1.

5.2.4 The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By an 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 the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and the Architect. Said agreement shall preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to his Sub-subcontractors.

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award

separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.

6.1.2 When separate contracts are awarded for different portions of the Project or other work 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 will provide for the coordination of the work of his own forces and of each separate contractor with the Work of the Contractor, who shall cooperate therewith as provided in Paragraph 6.2.

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate his Work with theirs as required by the Contract Documents.

6.2.2 If any part of the Contractor's Work depends for proper execution or results upon the work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Architect any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acceptance of the Owner's or separate contractors' work as fit and proper to receive his Work, except as to defects which may subsequently become apparent in such work by others.

6.2.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

6.2.4 Should the Contractor wrongfully cause damage to the work or property of the Owner, or to other work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.

6.2.5 Should the Contractor wrongfully cause damage to the work or property of any separate contractor, the Contractor shall upon due notice promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues or initiates an arbitration proceeding against the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings at the Owner's expense, and if any judgment or award against the Owner arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Paragraph 4.15, the Owner may clean up

and charge the cost thereof to the contractors responsible therefor as the Architect shall determine to be just.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 The Contract shall be governed by the law of the place where the Project is located.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party with respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

7.4 CLAIMS FOR DAMAGES

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder if and as required in the Bidding Documents or in the Contract Documents.

7.6 RIGHTS AND REMEDIES

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

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

7.7 TESTS

7.7.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Architect timely notice of its readiness so the Architect may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals conducted by public authorities. Unless otherwise provided, the Owner shall bear all costs of other inspections, tests or approvals.

7.7.2 If the Architect determines that any Work requires special inspection, testing, or approval which Subparagraph 7.7.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Subparagraph 7.7.1. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect's additional services made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

7.7.3 Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the Architect.

7.7.4 If the Architect is to observe the inspections, tests or approvals required by the Contract Documents, he will do so promptly and, where practicable, at the source of supply.

7.8 INTEREST

7.8.1 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 at the place of the Project.

7.9 ARBITRATION

7.9.1 All claims, disputes and other matters in question between the Contractor and the Owner arising out of, or relating to, the Contract Documents or the breach thereof, except as provided in Subparagraph 2.2.11 with respect to the Architect's decisions on matters relating to artistic effect, and except for claims which have been waived by the making or acceptance of final payment as provided by Subparagraphs 9.9.4 and 9.9.5, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining unless the parties mutually agree otherwise. No arbitration arising out of or relating to the Contract Documents shall include, by consolidation, joinder or in any other manner, the Architect, his employees or consultants except by written consent containing a specific reference to the Owner-Contractor Agreement and signed by the Architect, the Owner, the Contractor and any other person sought to be joined. No arbitration shall include by consolidation, joinder or in any other manner, parties other than the Owner, the Contractor and any other persons substantially involved in a common question of fact or law, whose presence is

required if complete relief is to be accorded in the arbitration. No person other than the Owner or Contractor shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Any consent to arbitration involving an additional person or persons shall not constitute consent to arbitration of any dispute not described therein or with any person not named or described therein. The foregoing agreement to arbitrate and any other agreement to arbitrate with an additional person or persons duly consented to by the parties to the Owner-Contractor Agreement shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

7.9.2 Notice of the demand for arbitration shall be filed in writing with the other party to the Owner-Contractor Agreement and with the American Arbitration Association, and a copy shall be filed with the Architect. The demand for arbitration shall be made within the time limits specified in Subparagraph 2.2.12 where applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

7.9.3 Unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain its progress during any arbitration proceedings, and the Owner shall continue to make payments to the Contractor in accordance with the Contract Documents.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Substantial Completion of the Work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the Work is the date established in a notice to proceed. If there is no notice to proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Architect when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

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

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the Work forward 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 progress of the Work by any act or neglect of the Owner or the Architect, or by any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, adverse weather conditions not reasonably anticipatable, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the Owner pending arbitration, or by any other cause which the Architect determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

8.3.2 Any claim for extension of time shall be made in writing to the Architect not more than twenty days after the commencement of the delay; otherwise it shall be waived. In the case of a continuing delay only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

8.3.3 If no agreement is made stating the dates upon which interpretations as provided in Subparagraph 2.2.8 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after written request is made for them, and not then unless such claim is reasonable.

8.3.4 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

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

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to the various portions of the Work, 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 only as a basis for the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least ten days before the date for each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Architect an itemized Application for Payment, notarized if required, supported

by such data substantiating the Contractor's right to payment as the Owner or the Architect may require, and reflecting retainage, if any, as provided elsewhere in the Contract Documents.

9.3.2 Unless otherwise provided in the Contract Documents, payments will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the Owner, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

9.4 CERTIFICATES FOR PAYMENT

9.4.1 The Architect will, within seven days after the receipt of the Contractor's Application for Payment, either issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor in writing his reasons for withholding a Certificate as provided in Subparagraph 9.6.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on his observations at the site as provided in Subparagraph 2.2.3 and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified. However, by issuing a Certificate for Payment, the Architect shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that he has reviewed the construction means, methods, techniques,

sequences or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

9.5.1 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.

9.5.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's Work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to his Subsubcontractors in similar manner.

9.5.3 The Architect may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Architect on account of Work done by such Subcontractor.

9.5.4 Neither the Owner nor the Architect shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.

9.5.5 No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

9.6 PAYMENTS WITHHELD.

9.6.1 The Architect may decline to certify payment and may withhold his Certificate in whole or in part, to the extent necessary reasonably to protect the Owner, if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2. If the Architect is unable to make representations to the Owner as provided in Subparagraph 9.4.2 and to certify payment in the amount of the Application, he will notify the Contractor as provided in Subparagraph 9.4.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which he is able to make such representations to the Owner. The Architect may also decline to certify payment or, because of subsequently discovered evidence or subsequent observations, he may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in his opinion to protect the Owner from loss because of:

- .1 defective Work not remedied,
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims,
- .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 another contractor,
- .6 reasonable evidence that the Work will not be completed within the Contract Time, or
- .7 persistent failure to carry out the Work in accordance with the Contract Documents.

9.6.2 When the above grounds in Subparagraph 9.6.1 are removed, payment shall be made for amounts withheld because of them.

9.7 FAILURE OF PAYMENT

9.7.1 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 any amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and the Architect, stop the Work until payment of the amount owing has been received. The Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order in accordance with Paragraph 12.3.

9.8 SUBSTANTIAL COMPLETION

9.8.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Architect a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect on the basis of an inspection determines that the Work or designated portion thereof is substantially complete, he will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. 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. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.8.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents.

9.9 FINAL COMPLETION AND FINAL PAYMENT

9.9.1 Upon receipt of 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 he finds the Work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information and belief, and on the basis of his observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable. The Architect's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.9.2 have been fulfilled.

9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment and (3), if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.9.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by the 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 the retainage stipulated in the Contract Documents, and if bonds have been furnished as provided in Paragraph 7.5, the written consent of the surety to the 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 the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.9.4 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

- .1 unsettled liens,
- .2 faulty or defective Work appearing after Substantial Completion,
- .3 failure of the Work to comply with the requirements of the Contract Documents, or
- .4 terms of any special warranties required by the Contract Documents.

9.9.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

10.2 SAFETY OF PERSONS AND PROPERTY

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

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

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the 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 progress of the Work, all 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 utilities.

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

10.2.5 The Contractor shall promptly remedy all damage or loss (other than damage or loss insured under Paragraph 11.3) to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to the 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 his obligations under Paragraph 4.18.

10.2.6 The Contractor shall designate a responsible member of his 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 the Architect.

10.2.7 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the Work.

ARTICLE 11

INSURANCE

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any 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' or workmen's compensation, disability benefit and other similar employee benefit acts;
- .2** claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;
- .3** claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;
- .4** claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;
- .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; and
- .6** claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater.

11.1.3 The insurance required by Subparagraph 11.1.1 shall include contractual liability insurance applicable to the Contractor's obligations under Paragraph 4.18.

11.1.4 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates shall contain a provision that

coverages afforded under the policies will not be cancelled until at least thirty days' prior written notice has been given to the Owner.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining his own liability insurance and, at his option, may purchase and maintain such insurance as will protect him against claims which may arise from operations under the Contract.

11.3 PROPERTY INSURANCE

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. If the Owner does not intend to purchase such insurance for the full insurable value of the entire Work, he shall inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of himself, his Subcontractors and the 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 failure of the Owner to purchase or maintain such insurance and to so notify the Contractor, then the Owner shall bear all reasonable costs properly attributable thereto. If not covered under the all risk insurance or otherwise provided in the Contract Documents, the Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site or in transit when such portions of the Work are to be included in an Application for Payment under Subparagraph 9.3.2.

11.3.2 The Owner shall purchase and maintain such boiler and machinery insurance as may be required by the Contract Documents or by law. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

11.3.3 Any loss insured under Subparagraph 11.3.1 is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgagee clause and of Subparagraph 11.3.8. The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to his Sub-subcontractors in similar manner.

11.3.4 The Owner shall file a copy of all policies with the Contractor before an exposure to loss may occur.

11.3.5 If the Contractor requests in writing that insurance for risks other than those described in Subparagraphs 11.3.1 and 11.3.2 or other special hazards 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.

11.3.6 The Owner and Contractor waive all rights against (1) each other and the Subcontractors, Sub-subcontractors, agents and employees each of the other, and (2) the Architect and separate contractors, if any, and their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this Paragraph 11.3 or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee. The foregoing waiver afforded the Architect, his agents and employees shall not extend to the liability imposed by Subparagraph 4.18.3. The Owner or the Contractor, as appropriate, shall require of the Architect, separate contractors, Subcontractors and Sub-subcontractors by appropriate agreements, written where legally required for validity, similar waivers each in favor of all other parties enumerated in this Subparagraph 11.3.6.

11.3.7 If required in writing by any party in interest, the Owner as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of his duties. He shall deposit in a separate account any money so received, and he shall distribute it in accordance with such agreement as the parties in interest may reach, or in accordance with an award by arbitration in which case the procedure shall be as provided in Paragraph 7.9. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate Change Order.

11.3.8 The Owner as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five days after the occurrence of loss to the Owner's exercise of this power, and if such objection be made, arbitrators shall be chosen as provided in Paragraph 7.9. The Owner as trustee shall, in that case, make settlement with the insurers in accordance with the directions of such arbitrators. If distribution of the insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.3.9 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

11.4 LOSS OF USE INSURANCE

11.4.1 The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of his property, including consequential losses due to fire or other hazards however caused, to the extent covered by insurance under this Paragraph 11.4.

ARTICLE 12

CHANGES IN THE WORK

12.1 CHANGE ORDERS

12.1.1 A Change Order is a written order to the Contractor signed by the Owner and the Architect, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time.

12.1.2 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be performed under the applicable conditions of the Contract Documents.

12.1.3 The cost or credit to the Owner resulting from a change in the Work shall be determined in one or more of the following ways:

- .1 by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 by unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 by the method provided in Subparagraph 12.1.4.

12.1.4 If none of the methods set forth in Clauses 12.1.3.1, 12.1.3.2 or 12.1.3.3 is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Architect on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Clauses 12.1.3.3 and 12.1.3.4 above, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; workers' or workmen's compensation insurance; bond premiums; rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. Pending final determination of cost to the Owner, payments on account shall be made on the Architect's Certificate for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion

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

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

12.2 CONCEALED CONDITIONS

12.2.1 Should concealed conditions encountered in the performance of the Work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within twenty days after the first observance of the conditions.

12.3 CLAIMS FOR ADDITIONAL COST

12.3.1 If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the Architect written notice thereof within twenty days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Paragraph 10.3. No such claim shall be valid unless so made. If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Architect. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

12.3.2 If the Contractor claims that additional cost is involved because of, but not limited to, (1) any written interpretation pursuant to Subparagraph 2.2.8, (2) any order by the Owner to stop the Work pursuant to Paragraph 3.3 where the Contractor was not at fault, (3) any written order for a minor change in the Work issued pursuant to Paragraph 12.4, or (4) failure of payment by the Owner pursuant to Paragraph 9.7, the Contractor shall make such claim as provided in Subparagraph 12.3.1.

12.4 MINOR CHANGES IN THE WORK

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

The Contractor shall carry out such written orders promptly.

ARTICLE 13

UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any portion of the Work should be covered contrary to the request of the Architect or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for his observation and shall be replaced at the Contractor's expense.

13.1.2 If any other portion of the Work has been covered which the Architect has not specifically requested to observe prior to being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor as provided in Article 6, in which event the Owner shall be responsible for the payment of such costs.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly correct all Work rejected by the Architect as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Architect's additional services made necessary thereby.

13.2.2 If, within one year after the Date of Substantial Completion of the Work or designated portion thereof or within one year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor shall remove from the site all portions of the Work which are defective or non-conforming and which have not been corrected under Subparagraphs 4.5.1, 13.2.1 and 13.2.2, unless removal is waived by the Owner.

13.2.4 If the Contractor fails to correct defective or non-conforming Work as provided in Subparagraphs 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 3.4.

13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may upon ten additional days' written notice sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Architect's additional services made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

13.2.7 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his 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 his obligations other than specifically to correct the Work.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

13.3.1 If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 14

TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the Work is stopped for a period of thirty days under an order of any court or other public authority

having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault 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, or if the Work should be stopped for a period of thirty days by the Contractor because the Architect has not issued a Certificate for Payment as provided in Paragraph 9.7 or because the Owner has not made payment thereon as provided in Paragraph 9.7, then the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

14.2 TERMINATION BY THE OWNER

14.2.1 If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven days' written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished.

14.2.2 If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the Architect's additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of the Contract.

SECTION 00 0001
ADDITIONAL SUPPLEMENTAL GENERAL CONDITIONS

1. AMENDMENTS OF GENERAL CONDITIONS

“The Supplementary General Conditions” contain the following changes and additions to General Conditions: “American Institute of Architects: Standard Document No. A201, hereinafter referred to as the “A.I.A. General Conditions: Where any part of the A.I.A. General Conditions is modified or voided by the Supplementary General Conditions, the unaltered provision shall remain in effect. The A.I.A. General Conditions are amended as follows:

a. ARTICLE 4, CONTRACTOR

(1) Add paragraph 4.5.2., as follows:

The Contractor shall guarantee in writing all completed work to be free from defects in materials and/or workmanship for the period of one (1) year from the date of final punch list and acceptance by the owner.

2. SPECIFICATIONS

The division of the specifications into different sections is done for the convenience of reference and is not intended to control the Contractor in dividing the work among subcontractors or to limit the scope of work performed by any trade

3. DIMENSIONS

a. Each contractor and subcontractor shall check and verify all conditions, measurements and dimensions and shall promptly call the attention of the Owner and Architect to any omissions or discrepancies, before commencement of work.

4. SHOP DRAWINGS

- a. As soon as possible after the award of the Contract, the Contractor and various Subcontractors shall prepare and submit to the Architect for approval prints of shop drawings in pdf and autocad format, where required herein.
- b. Shop drawings shall indicate the kind of material; give the size and gauge of members, the method of anchoring and securing members together, the method of securing the work to adjacent structure or materials, and other pertinent data. Data shall contain scale and detail as required to illustrate the work.
- c. The Architect shall check the shop drawings for conformity to design intent only, and takes no responsibility for accuracy, fit, or structural soundness or work.

5. SKILLED LABOR

Work, which should properly be done with skilled labor, shall not be attempted with common laborers. The Contractor shall have on the job at all times ample equipment and personnel to carry on the work properly, including such tools as may be necessary to meet emergency requirements.

6. TEMPORARY LIGHT AND POWER

The Contractor shall make the necessary application to the lighting company and pay for all charges, costs, and expenses incidental to the installation and maintenance of temporary lighting and power as required in connection with the operations. Lighting shall be sufficient in all locations to permit the mechanics of the various trades to properly and satisfactorily execute their work. Power outlets shall be so designated. Temporary light and power shall be maintained until the completion of the building or for a shorter period when so directed by the Architect; when its use is no longer required it shall be completely removed.

7. OVERLOADING

The weight of the materials stored upon or carried over the floors and roof shall not be in excess of the normal live loads for these areas.

8. TEMPORARY ENCLOSURES

The Contractor shall provide all temporary enclosures that may be necessary to protect the public, user agencies, the interior of the buildings from the construction activities, weather elements or from trespassing and vandalism. The enclosures shall include temporary walls, doors, boarding, etc., complete with items of hardware, such as hinges and properly sized locks and padlocks and shall be installed in locations as directed by the Architect.

9. TEMPORARY WATER

The Contractor shall provide all necessary and required temporary piping, equipment, etc., for obtaining water for all trades during the progress of the work. The Contractor shall arrange and pay for all water required for the work of the various trades until the Owner's acceptance of the entire project.

10. RESTORATION OF ROADWAYS AND PAVEMENTS

Roadway pavements and curbs that are broken, damaged, settled or otherwise defective as a result of receiving, handling or storage of materials or the performance of any work under this Contract shall be restored by the Contractor.

11. HANDLING MATERIALS

- a. The Contractor and Subcontractors shall be responsible for the proper care and protection of all materials, equipment, etc., delivered at the site. Building materials, cement, contractor's equipment, etc., may be stored on the premises, but the placing of the same shall be subject to the approval of the General Contractor. When any room in the building is used as a shop, storeroom, etc., the

one making use of such room shall make any repairs, patching or cleaning arising from such use.

- b. Each Contractor and Subcontractor shall protect and be responsible for any damage to his work or material, from the date of the agreement until the final payment is made, and shall make good without cost to the Owner any damage or loss that may occur during this period. Each Subcontractor shall handle all material as directed, so that it may be inspected by the Architect and Contractor. Should any material be found defective or any way contrary to the Contract, this material, no matter in what stage of completion, may be rejected by the Architect.

12. OCCUPATION BY OWNER

The owner shall have the right to take possession of and use any completed or partially completed portions of the structure or work, notwithstanding the fact that the time for completing the entire work or such portions thereof may not have expired; but such possession and use shall not be an acceptance of the work.

13. INTERRELATION OF DOCUMENTS AND OMISSIONS

- a. The Drawings and Specifications are complementary each to the other and what is called for by one shall be as binding as if called for by both. Each Contractor shall call attention, upon submission of bid, of any omissions or errors in plans or any conflict between plans and Specifications. Submission of bid without any such notification shall be evidence that these plans are free of any errors, omissions, or conflicts and shall constitute full acceptance and understanding of the work involved.
- b. The interrelation of the Specifications, the Drawings, and the schedules is as follows: The Specifications determine the nature and setting of the several

materials, the Drawings establish the quantities, dimensions and details, and the Schedules give the locations.

- c. Should the Drawings disagree in themselves, or with the Specifications, the better quality or greater of work or materials shall be estimated upon, and, unless otherwise ordered by the Architect in writing, shall be performed or furnished. In case the Specifications should not fully agree with the Schedules, the latter shall govern. In case the details do not fully agree with the Schedules, the latter shall govern. Figures given on Drawings govern scale measurements and large scale details govern small scale drawings.
- d. Anything found on the Drawings and not mentioned in the Specifications, or vice versa, or anything not expressly set forth in either, but which is reasonable implied, shall be furnished as though specifically shown mentioned in both, without extra charge.
- e. Should anything be omitted from the Drawings, necessary to the proper execution of the work herein described, it shall be the duty of the Contractor to so notify the Architect before signing the Contract, and in the event of failure to give notice, the Contractor shall make good any damage, incompleteness, or defects, in the work caused thereby without extra charge.

14. FIRE PROTECTION

- a. The Contractor shall observe and enforce throughout the entire period of construction all requirements of the local Fire Department and the insurance companies to minimize the fire hazard. The Contractor shall post signs and warnings as required to maintain and enforce all regulations imposed to secure such protection and all Contractors shall comply with such regulations.

- b. Combustible refuse shall be removed from the buildings daily.
- c. No oils, gasoline, or other volatile liquids shall be kept on or inside the buildings.
- d. No open fires shall be allowed near, on or within the buildings.
- e. All other similar necessary precautions shall be taken to reduce the fire hazard.

15. INDEMNITY AGREEMENT

- a. Contractor hereby agrees to protect, defend, hold harmless, and indemnify the Architect, the Owner from and against any and all claims, actions, liabilities, losses and expenses, relating to losses or damages, allegedly or actually suffered by a person or persons, including the loss of life, arising out of or incidental to the work or activities of the Contractor or any Subcontractor under this Contract.

16. CERTIFICATE OF OCCUPANCY

At the completion of work the Contractor shall obtain for the Owner both a temporary certificate of occupancy and a final certificate of occupancy from the Pueblo of Santa Ana's Building Code Enforcement agency.

17. DEFECTIVE WORK

- a. Any work or material not acceptable or not conforming to law and regulations by all bodies having jurisdiction shall be removed at the request of the Architect and/or the Contractor.
- b. Rejection of the Contractor's work shall be in accordance with, but not limited to, the following reasons:
 - 1. Deviation from plans and Specifications.
 - 2. Any equipment or materials not installed in a "workmanlike" manner.
 - 3. Any equipment or material that is not installed properly in accordance with manufacturer's recommendations or applicable building codes.

18. SUBSTITUTION OF MATERIAL

- a. Where a definite material is specified, it is not the intention to discriminate against any “approved equal: product made by another manufacturer. It is, rather, the intention to set a definite standard. Open competition is expected, but in all cases, samples of a proposed substitution shall be made unless authorized in writing by the Architect.
- b. In making up his bid, the Contractor shall include in his estimate the cost of the material specifically specified. Within one month after the Contract is awarded, he shall submit to the Architect any proposals for substitutions or similar materials that he may care to suggest, together with samples and complete data. “Similar” shall be taken in its general sense not to mean identical but rather equal in performance and quality.
- c. The Architect will investigate all such proposals, consult with the Owner and render final decisions as promptly as possible. The Architect does not bind himself to consider substitutions after the expiration of one month, since delays occasioned by the necessary investigations will tend to delay the ordering of materials, and hence the progress of the work. The decisions of the Architect in the matter of substitutions and equality shall be final.
- d. Should a substitution be accepted under the provisions of the above clauses and should this substitution prove defective or otherwise unsatisfactory for which it was intended, within the guaranty period, the Contractor shall replace the defective materials specified, on which the specification required him to base his proposal.

19. CLOSING UP OF WORK TO BE INSPECTED

No structural parts, pipes, wiring, etc., shall be enclosed or encased until inspected and approved by the proper authorities, according to law and good practice. All necessary cutting and repairing shall be done by the Subcontractor whose work is to be cut, without extra cost.

20. DEFINITIONS

Where the word “Contractor” appears in these Specifications, it means Contractor or Subcontractor whose contractual obligation it is to perform the work of the particular specification section.

21. TEMPORARY SCAFFOLDS, STAGING, SHORING, BRACING, AND SAFETY DEVICES & PUBLIC PROTECTION.

Provide, erect, maintain and remove when directed, all sidewalk, bridges, public and pedestrian protection scaffolding, staging, platforms, temporary walls, runways, temporary flooring, guards, railing, stairs, shoring, bracing, etc., as required by local, state, and national codes or laws, for the protection of workmen and the public. The construction, inspection and maintenance of the above items shall comply with all safety codes and regulations as applicable to the project.

22. CODE

All work done under this Contract shall conform to all applicable provisions of the Building laws and all applicable laws and/or requirements of the Pueblo of Santa Ana and of any other authorities having jurisdiction.

23. UNUSUAL CONDITIONS

It shall be the responsibility of the Contractor and his Subcontractors to protect the Owner from harm in case a previously undiscovered error or existing condition may

come to their attention. Any condition that appears illegal, incorrect, or otherwise unsatisfactory shall be brought to the Architect's attention immediately.

24. CUTTING AND PATCHING

Each Contractor shall leave all chases, holes or openings straight, true and proper size in his own work as may be necessary for the proper installation of his own or other Contractor's work, consulting with the Contractors concerned regarding proper location and size of same. No excessive cutting will be permitted nor shall any structural members be cut without the written approval of the Architect. After such work has been installed, he shall carefully fit around, close up, repair, patch and point up same as directed, to the entire satisfaction of the Architect.

25. EXTRAS

Bills for extras will be allowed only when the work is ordered in writing. No bills based upon verbal orders will be considered by the Owner unless accompanied by written order of the Owner. Applications for extras shall be submitted not later than one week from the date such extra work is discussed, contemplated, or requested. No list of work will be considered later, or at the end of the project. Extras must be kept current and approval obtained as the work progresses.

26. CLEANING OF WINDOWS

All new windows and existing windows that are to remain shall have all glass and metal thoroughly cleaned of all dirt, grease, and paint.

27. REMOVAL OF EXISTING RUBBISH AND DEBRIS

The Contractor shall remove all existing rubbish, furniture, furnishings, and other debris found at job site.

28. PROGRESS SCHEDULE

Prior to commencement of work the Contractor shall submit to the Owner for approval a progress schedule showing anticipated time of start and completion for all trades as well as critical path items for timely completion of work. The Contractor shall update this chart every two weeks during the entire construction period.

29. SUBCONTRACTOR APPROVAL

Prior to award of the contract, the Contractor shall submit to the Owner a list of Subcontractors. The Owner shall have the right to reject any Subcontractor he deems unqualified to perform any subcontract item.

30. TRADE PAYMENT BREAKDOWN

Prior to the start of construction the Contractor shall submit for the Owner and Architect's approval a trade payment breakdown showing a schedule of values for all trades. Upon approval, this breakdown shall be used as the basis for bi-weekly payment requisitions.

31. INSURANCE REQUIREMENTS

Contractor shall carry the following minimum insurance as follows for the duration of the Contract.

1. Workman's Compensation and Employer's Liability Insurance

a) New Mexico Statutory Coverage b) Employer's Liability

-\$500,000 each person

-\$500,000 each occurrence

2. Comprehensive General Liability Insurance

a) Public Liability -Including Premises,

Products, Complete Operations and Contractual

(1) Bodily Injury -\$1,000,000 each occurrence -\$5,000,000 aggregate

(2) Property Damage -Including XCU (Explosion, Collapse, and Underground Damage)

-\$5,000,000

3. Comprehensive Automobile Liability Insurance (including owned. non-owned. and hired vehicles)

(a) Bodily Injury and Property Damage Liability -\$1,000,000 each accident

30 day cancellation required.

IMPORTANT -CERTIFICATES MUST INCLUDE THE FOLLOWING

LANGUAGE: Santa Ana Pueblo, John Barton Architects, LLC, and all family, agents and employees are hereby named as Additional Insured under this policy for all Liability coverages, are held harmless & indemnified.

END OF SECTION

SECTION 01010

Summary of Work

01010-1

PART 1 - GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- A. Work of this contract comprises the general construction and all related work for four new houses and renovation work on the White House Meeting room, all located at Tamaya, the old Pueblo of Santa Ana, New Mexico, as shown on the drawings and in the specifications.
- B. Deleted work: When work is deleted by addenda prior to bidding or by contract modification after award of the contract, only that portion of the specifications affected shall be considered as deleted. Requirements affecting similar or related work shall remain in effect.

- 1.2 **BASE BID:** The base bid includes all work described by the Contract Documents.

- 1.3 **ALTERNATE BID PRICES:** As indicated, Bidders to provide alternate Bid Prices, either subtractions or additions to the Base Bid price for all indicated Alternate items.

- 1.4 **OWNER FURNISHED MATERIAL:** The Pueblo of Santa Ana. retains the right to furnish their own material and or labor for any portion of the work when contract is amended accordingly.

1.5 CONTRACTOR'S DUTIES:

- A. Except as specifically noted, provide and pay for:
 - 1. Labor, materials and equipment.
 - 2. Tools, construction equipment and machinery.
 - 3. Heat required for construction.
 - 4. Other facilities and services necessary for proper execution and completion of Work.
- B. Pay all legally assessed taxes including New Mexico Gross Receipts Tax, as applicable.

- C. Secure and pay for, as necessary, for proper execution and completion of the Work, and as applicable at the time of receipt of bids:
 - 1. Permits
 - 2. Government Fees
 - 3. Licenses
- D. Give required notices.
- E. Comply with current codes, ordinances, rules, regulations, orders, and other legal requirements of public authorities, which bear on the performance of the work. Governing codes and regulatory agencies specific to this work include:
 - 1. New Mexico Building Code, incorporating the International Building Code latest edition
 - 2. Life Safety Code, latest edition – National Fire Protection Association Document NFPA 101
 - 3. Uniform Fire Code
 - 4. National Fire Protection Associations Standards
 - 5. Uniform Mechanical Code
 - 6. Uniform Plumbing Code
 - 7. National Electrical Code
 - 8. Occupational Health and Safety Administration
 - 9. Construction Industries Division, Regulation and Licensing Department, State of New Mexico
 - 10. Environmental Improvement Division, Health and Environment Division, State of New Mexico

- 1.6 **GRADES LINES AND LEVELS:** Establish and maintain all required grades, lines, levels and benchmarks. Be responsible for engineering and staking the roof and confirm elevations with the Owner's representative. Report obvious conflicts immediately to the Owner's representative.

1.7 **SITE CONSIDERATION:** The Pueblo of Santa Ana will be in operation during this project, including the adjacent properties which include vehicular traffic, visitor parking and access.

These facilities will remain open during construction and the duration of this contract. Contractor shall cooperate fully with Owner and Users ensure that contractor's operations do not interfere with operations of the Owner and Users.

There may be delays encountered due to historic and religious artifacts, festivals and ceremonial days at the Tamaya Pueblo. These delays will not be applied to the overall project timeline.

The Pueblo will monitor demolition and excavation work and the Contractor is to assist with this Archeological and Historic monitoring.

---END---

SECTION 01200

Project Meetings

PART 1 - GENERAL

1.1 GENERAL

- A. Related requirements specified elsewhere:
 - 1. Pre-bid Conferences: Advertisement for Bids and Instructions to Bidders
 - 2. Summary of Work: Section 01010.
 - 3. Submittal: Section 01300
 - 4. Contract Closeout: Section 01700
 - 5. Final Cleaning: Contract Closeout, Section 01700
 - 6. Project Record Drawings: Contract Closeout, Section 01700
 - 7. Warranty Review: Contract Closeout, Section 01700
- B. The Architect shall schedule and administer the pre-construction conference.
- C. The Architect shall schedule and administer periodic meetings and specifically called meetings throughout the progress of the Work.
- D. Representatives of the Contractor, subcontractor and suppliers attending the meetings shall be qualified to act on behalf of the entity which each represent.

1.2 PRE-CONSTRUCTION MEETING:

- A. Scheduled prior to start of the Work.
- B. Located at the Project site.
- C. Attendance:
 - 1. Owner's Staff.
 - 2. Architect and his consultants.
 - 3. Contractor's Superintendent.
 - 4. Major subcontractors, major suppliers and others as appropriate.
- D. Suggested Agenda:
 - 1. Contract administration procedures.

2. Designation of responsible personnel.
3. Tentative schedule of project meetings.
4. Procedures and processing of:
 - a. Submittal of shop drawings, product data and samples.
 - b. Field decisions.
 - c. Change orders.
 - d. Construction schedule up-dates.
 - e. Applications for Payment.
5. Procedures for maintaining Record Documents (see Section 1700 Contract Closeout, subsection 1.5 Project Record Documents.)
6. Use of premises:
 - a. Office and storage area.
 - b. Owner's requirements.
7. Safety procedures.
8. Security procedures.
9. Housekeeping procedures.

1.3 PERIODIC PROGRESS MEETINGS:

A. Attendance:

1. Owner's Staff.
2. Architect and his consultants.
3. Contractor's Superintendent.
4. Major subcontractors, major suppliers and others as appropriate.

B. Suggested Agenda

1. Field observations, problems and conflicts.
2. Revisions to the Construction Schedule.
3. Maintenance of quality standards.

---END---

SECTION 01300

Submittals

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Submittals to the Architect shall include:
 - 1. Shop drawings, product data, installation instructions and samples required by specification or as indicated as required during the Pre-Bid Conference.
 - 2. Progress Schedule.
 - 3. Schedule of Values.
- B. Applications to the Architect include:
 - 1. Applications for Payment.
 - 2. Applications for Claims and Proposals
- C. Contract Closeout submittal requirements are included in Contract Closeout Section 01700.

1.2 SUBMITTAL SCHEDULE: Within 15 days after the date of the Notice to Proceed, the Contractor shall submit to the Architect all submittals. The Schedule of Values and the Progress Schedule must be submitted at the time of the Preconstruction Conference.

- A. Each submittal shall be identified by a number assigned by the Contractor. Assigned numbers shall be used in identifying the individual submittals during the course of the contract period. The number shall be used in all correspondence referring to this submittal.
- B. Each submittal shall indicate names of manufacturer, supplier, and installing sub-contractor.
- C. The Contractor shall schedule a minimum of 15 days for review for each submittal by the Architect.
 - 1. The Contractor shall consider the possibility of submittal revision or resubmission time when determining his schedule relative to his critical sequencing of the Work.

1.3 SUBMISSION AND APPLICATION REQUIREMENTS:

- A. Unless instructed for specific submittal requirements, submit number of copies of all materials which Contractor requires for distribution plus four copies which will be retained by the Architect. In the case of shop drawings, submit one sepia or reproducible of each drawing sheet in addition to the copies required by the preceding sentence.
- B. Accompany submittals with transmittal letter, in duplicate, containing:
 - 1. Date and revision dates as applicable.
 - 2. Project Name & Number.
 - 3. Contractor's name and address.
 - 4. Submittal Number.
 - 5. The quantity of each item submitted.
 - 6. Notification of deviations from Contract Documents.
 - 7. Other pertinent data.
- C. Address submittals and applications to the Architect of Record.

PART 2 - SUBMITTAL AND APPLICATION ITEMS

2.1 PROGRESS SCHEDULE:

- A. Submit Progress Schedule for entire work and submit monthly revisions.
- B. Form of Schedule: Horizontal Bar Chart
 - 1. Provide separate horizontal bar row for each trade or operation with logically grouped phases identified.
 - a. Order rows according to chronological order or the starting date of each phase of work.
 - b. Identify each row by major specification reference and distinct graphic delineation.
 - 2. Provide vertical delineation for columns indication date of first day in each work week throughout duration of the contract period.
 - 3. Allow space for monthly updating.
- D. Show dates for beginning and completion of each phase of the construction work.
- E. Updating: Submit updated schedule with each pay request. Update to indicate progress on all activities with actual beginning and completion

dates shown and revised projections for future beginning and completion dates.

2.2 SCHEDULING OF VALUES:

- A. The Schedule of Values shall list the installed values of the component parts of the work in sufficient detail to serve as a basis for computing values for progress payment during construction.
 - 1. Identify and list major operations for the project. Include related specification reference in identification.
 - 2. Gross Receipts Tax shall be a separate item.
- B. Form: Schedule to be typed AIA Form G702 and G703 (latest edition) on 8-1/2" X 11" white paper. (Contractor's standard forms and/or automated printouts will be considered for approval upon the Contractor's request.)
Identify Schedule with:
 - 1. Project Name & Number.
 - 2. Name of Owner and Architect.
 - 3. Name and Address of Contractor.
 - 4. Date of Submission.
 - 5. Submittal Number.
- C. Values:
 - 1. Except for Gross receipts tax, each value shall include a directly proportional amount of the Contractor's Overhead and Profit.
 - 2. The sum of all values listed in the schedule shall equal the total Contract Sum.

2.3 SHOP DRAWINGS, PRODUCT DATA, INSTALLATION INSTRUCTIONS AND SAMPLES:

- A. General: Submit to the Architect for review shop drawings, product data installation instructions and samples as required by each specification.
- B. Submission Requirement: Submittal shall include:
 - 1. Date and revision dates.
 - 2. Project Name & Number.
 - 3. The names of:
 - a. Architect
 - b. Engineer
 - c. Contractor
 - d. Subcontractor
 - e. Supplier
 - f. Manufacturer
 - g. Separate detailer when pertinent

4. Identification of product or material.
5. Relation to adjacent structure or materials.
6. Field dimensions, clearly identified as such.
7. Specification reference.
8. Applicable standards, such as ASTM number of Federal Specification.
9. Blank space, 3-1/2 inches X 3-1/2 inches, for the Architect's or Engineer's stamp.
10. Identification of deviations from Contract Documents.
11. Contractor's stamp, initialed or signed and dated, certifying his review of submittal, verification of field measurements and compliance with contract documents.

C. Shop Drawings shall:

1. Be original drawings, prepared by Contractor, Subcontractor, Supplier or Distributor, which illustrate some portion of the work, showing fabrication layout, setting or section details.
2. Be prepared by a qualified detailer.
3. Identify details by reference to sheet and detail numbers shown on contract drawings.
4. Be minimum sheet size: 8-1/2 inches X 11 inches.
5. Be submitted with one sepia or reproducible of each drawing sheet, in addition to the copies required by Section 1.2.A.

D. Product Data and Installation Instructions:

1. Manufacturer's standard schematic drawings:
 - a. Modify drawings to delete information which is not applicable to project.
 - b. Supplement standard information to provide additional information applicable to project.
2. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, installation instructions and other standard descriptive data.
 - a. Clearly mark each copy to identify pertinent materials, products or models.
 - b. Show dimensions and clearances required.
 - c. Show performance characteristics and capacities.
 - d. Show wiring diagrams and controls.

E. Samples:

1. Physical examples to illustrate materials, equipment or workmanship, and to establish standards by which completed work is judged.
2. Office samples: Of sufficient size and quantity to clearly illustrate:
 - a. Functional characteristics of product or material, with integrally related parts and attachment devices.

- b. Full range of color samples.
- c. After review, samples may be used in construction of project with written approval of the Architect.
- 3. Field samples and mock-ups: (If required by Specification).
 - a. Erect at project site at location acceptable to Architect.
 - b. Construct each sample or mock-up complete, including work of all trades required in finished work.

2.4 APPLICATION FOR PAYMENT: In accordance with Article 5, Progress Payments, of the Agreement between Owner and Contractor, and with Article 9 of the General Conditions of the Contract, submit four copies of AIA Form G702 and G703 (latest edition) filled out per the Schedule of Values (see Paragraph 2.2 above) and accompanied by annotated Progress Schedule (See Paragraph 2.1, D above)

2.4 APPLICATION FOR CLAIMS AND PROPOSALS

- A. Provide 4 copies of claims for additional cost, including final costs under Unit Price application (General Conditions 12.3), claims for extensions of time (General Conditions 8.3.2) and proposals for changes in the Work.
- B. CLAIMS: Specify event giving rise to claim and date when the event commenced. Where costs are involved provide detail described in modification 21.0 of the Supplementary Conditions, Section 00800. Note that claims must be made within twenty (20) days of the event.
- C. PROPOSALS: Within fifteen (15) days of any request for proposal from the Architect provide the following:
 - 1. Proposed extended completion date or Contract Time.
 - 2. Provide cost breakdowns and markups as required by modification 21.0 of the Supplementary Conditions, Section 00800.

PART 3 - EXECUTION:

3.1 CONTRACTOR'S RESPONSIBILITIES:

- A. Review all submittals prior to submission.
- B. Affix Contractor's approval stamp, sign and date, prior to submission.
- C. Coordinate each submittal with requirements of work and of Contract Documents.
- D. Shop Drawings, Product Data, Installation instructions and Samples:

1. Verify:
 - a. Field Measurements.
 - b. Field construction criteria.
 - c. Catalog numbers and similar data.
 - d. Confirm and correlate all quantities and dimensions.
 2. The Contractor is responsible for all information that pertains solely to the fabrication processes and for techniques or assembly and construction.
- E. The Contractor is responsible for the coordination of the work of all trades.
- F. Contractor's responsibility for errors and omissions in submittals is not relieved by the Architect's/Engineering review.
- G. Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by Architect's/Engineer's review of submittals, unless Architect gives written acceptance of specific deviations.
- H. Notify Architect in writing at time of submission of deviations in submittals from requirements of Contract Documents.
- I. Begin no work which requires submittals until return of submittals with Architect's or Engineer's stamp and initials or signature indication review.
- J. After Architect's/Engineer's review, distribute copies.

3.2 ARCHITECT'S/ENGINEER'S DUTIES:

- A. General: The Architect's/Engineer/s review does not relieve the Contractor of compliance with the plans and specifications.
- B. Review submittals with reasonable promptness.
- C. Review for:
 1. Design concept of project
 2. Information given in contract documents.
- D. Review of separate items does not constitute review of an assembly in which item functions.
- E. Affix stamp and initials or signature certifying to review of submittal.
- F. Return submittals to Contractor for distribution.
- G. Request additional submittals if necessary.

3.3 RESUBMISSION REQUIREMENTS:

- A. General: Revise and/or resubmit items as requested by the Architect within 7 days after return of review copy.
- B. Shop drawings:
 - 1. Revise initial drawings as required and resubmit as specified for initial submittal.
 - 2. Indicate on drawings any changes which have been made other than those requested by Architect.
- C. Product data and samples: Submit new data and samples as required for initial submittal.

3.4 DISTRIBUTION OF SUBMITTALS AFTER REVIEW:

- A. Distribute copies of submittals which carry Architect's or Engineer's stamp as follows: (Architect will retain copies of all submittals).
 - 1. Contractor's file.
 - 2. Job site file.
 - 3. Subcontractors
 - 4. Suppliers
 - 5. Fabricator
- B. Distribute samples as directed.

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SECTION 01400

Quality Control

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

A. Testing Laboratory Services: Section C1410.

1.2 QUALITY CONTROL GENERAL: Maintain quality control over all aspects of the Work including suppliers, manufacturers, products, services, site conditions and workmanship, to produce work of specified quality.

1.3 MATERIALS AND EQUIPMENT: Deliver to the site in unopened manufacturer's original containers, clearly marked with manufacturer's labels, grade stamps and seals. Immediately remove damaged or incorrect materials from site. Store off the ground and protect from weather, fire, distortion and other potential sources of damage.

1.4 WORKMANSHIP:

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration and racking.

1.5 REFERENCED STANDARDS: When standards are referenced in the Contract Documents, use latest published edition as of the issue date of the Building Permit.

1.6 MANUFACTURER'S INSTRUCTIONS:

- A. Comply with all requirements of manufacturer's printed specification and installation instructions. Should instructions conflict with the Contract Documents, request clarification from the Architect before proceeding. Use all applicable details and accessories recommended by the manufacturer.
- B. When required by individual specification section, submit manufacturer's printed instructions, in the quantity required for product data, for delivery, storage, assembly, installation, start-up, adjusting and finishing as appropriate.

- 1.7 **MANUFACTURER’S CERTIFICATES:** When required by individual specification section, submit manufacturer’s certificate that products meet or exceed specified requirements.
- 1.8 **WARRANTIES (GUARANTEES):**
- A. Categories of warranties required for the work include:
 - 1. Special project warranty issued by Contractor and, where required, countersigned by Installer or other recognized entity involved in performance of the work.
 - 2. Specified product warranty issued by a manufacturer or fabricator, for compliance with requirements in contract documents. Refer to sections of Division 2 through 32 for requirements of specified warranties.
 - 3. Coincidental product warranty available on a product incorporated into work, by virtue of manufacturer’s publication of warranty without regard for application requirements (non-specified warranty).
 - B. Warranty Obligations: Restore or remove-and-replace warranted work to its originally specified condition, at such time during warranty as it does not comply with or fulfill terms of warranty. Restore or remove-and-replace other work which has been damaged by failure of warranted work, or which must be removed and replaced to gain access to warranted work. Except as otherwise indicated or required by governing regulations, warranties do not cover consequential damages to property other than work of the contract, (e.g., building contents). Cost of restoration or removal-and-replacement is Contractor’s obligation, without regard to whether Owner has already benefited from use of failing work.
 - C. Reinstatement of Warranty: Upon restoration or removal-and-replacement of warranted work which has failed, reinstate the warranty by issuing newly executed form, for at least the remaining period of time of the original warranty, but for not less than half of the original warranty period.
 - D. Owner’s Recourse: Warranties and warranty periods do not diminish implied warranties, and do not deprive Owner of actions, rights and remedies otherwise available for Contractor’s failure to fulfill requirements of the Contract Documents. Owner reserves right to reject coincidental product warranties considered to conflicting with or detracting from requirements of the Contract Documents.
- 1.9 A. FIELD TESTING as identified in Item 12 of the Supplementary Conditions and Item
- 1. above, will be provided by the Owner at no expense to the Contractor. Provided, however, that the Contractor shall pay for all retesting due to first FIELD TEST or subsequent FIELD TEST failing to show results meeting specifications. FIELD TESTING to be provided by the

Owner will include FIELD TESTS for quality control of concrete materials and installations and for earthwork and subgrade preparation.

- B. Other than provided above, the Contractor shall arrange for, and bear all cost of, the services of an Independent Testing Laboratory to perform inspections, tests and other services required by the various Specification Sections, in accordance with the General Conditions and Supplementary Conditions.
- C. Submit reports to the Owner, Architect and keep a copy in the Job File, giving observations and results of tests indicating compliances or non-compliance with specified standards.
- D. Coordinate with the Testing Laboratory personnel: furnish tools, samples of materials, design mix, equipment, storage and assistance required.
 - 1. Notify the Architect and the Testing Laboratory 48 hours prior to expected time for operations requiring testing services.
 - 2. Make arrangements for and pay for additional tests for materials that fail to comply with the required standards and for the Contractor's convenience.

---END---

SECTION 01410

Testing Laboratory Services

PART 1 - GENERAL

1.01 GENERAL REQUIRMENTS:

- A. This section describes testing laboratory services to be performed during the course of the work. The Contractor will provide these testing laboratory services.

1.02 RELA TED REQUIREMENTS:

- A. Document A201: General Conditions of the Contract for Construction.
- B. Document 00800: Modifications to the General Conditions.
- C. Section 02012: Geotechnical Reports.
- D. Individual Specifications Sections relating to inspections and tests required.

1.03 REFERENCES:

- A. The following references have the same force and effect for the work and are a part of the contract documents by reference, as if copied directly into the contract documents, or as if published copies were bound herewith.
 - 1. ANSI/ASTM D3740 – Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
 - 2. ANSI/ASTM E329 – Standard Recommended Practice for Inspection and Testing Agencies for Concrete, Steel, and Bituminous Materials as Used in Construction.

1.04 SELECTION AND PAYMENT:

- A. The Contractor shall employ and pay for an independent laboratory to perform specified inspections and testing. The Contractor shall notify and schedule required testing from the Contractor's testing laboratory.
- B. Employment of the Contractor's testing laboratory shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.05 QUALITY ASSURANCE:

- A. Comply with requirements of ANSI/ASTM E329 and ANSI/ASTM D3740.
- B. Testing equipment shall be calibrated at reasonable intervals with devices of an accuracy consistent with NBS Standards or accepted values of natural physical constants.

1.06 LABORATORY RESPONSIBILITIES:

- A. Test samples of mixes submitted by Contractor.
- B. Provide qualified personnel at site after due notice; cooperate with Architect and Contractor in performance of services.
- C. Perform specified inspection, sampling, and testing of products in accordance with specified standards.
- D. Ascertain compliance of materials and mixes with requirements of Contract Documents.
- E. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
- F. Perform additional inspections and tests required by Architect/Engineer.
- G. Attend pre-construction conferences and progress meetings.

1.07 LABORATORY REPORTS:

- A. After each inspection and test, promptly submit two (2) copies of laboratory report directly to Architect/Engineer, and to Contractor. Include: date issued, project title and number, name of inspector, date and time of sampling or inspection, identification of product and specifications section, location in the project, type of inspection or test, date of test, results of tests, and conformance with Contract Documents. When requested by Architect/Engineer, provide interpretation of test results.

1.08 LIMITS ON TESTING LABORATORY AUTHORITY:

- A. Laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
- B. Laboratory may not approve or accept any portion of the Work.
- C. Laboratory may not assume any duties of Contractor.
- D. Laboratory has no authority to stop Work.

1.09 CONTRACTOR'S RESPONSIBILITIES:

- A. Deliver to laboratory at designated location adequate samples of materials proposed to be used which require testing, together with proposed mix designs.
- B. Cooperate with laboratory personnel and provide access to work for conducting the tests.
- C. Provide incidental labor and facilities to provide access to work to be tested, to obtain and handle samples at the site or at source of products to be tested, to facilitate tests and inspections, and for storage and curing of test and samples.
- D. Notify Architect/Engineer and laboratory 24 hours prior to expected time for operations requiring inspection and testing services.
- E. Arrange with laboratory and pay for samples and tests required by Contractor beyond specific requirements and required when initial tests indicate work does not comply with Contract Documents.

---END OF SECTION---

SECTION 01500

Temporary Facilities and Control

PART 1 - GENERAL

1.1 GENERAL:

- A. Provide all facilities and controls of substantial construction, as required, to serve intended purpose during full life of project or for full extent of need during construction, and as approved by Architect.

1.2 QUALITY ASSURANCE

- A. REGULATIONS: Comply with requirements of local laws and regulations governing construction and local industry standards, in the installation and maintenance of temporary services and facilities, including but not limited to the following:
 - 1. Building Codes, including local requirements for permits, testing and inspection. See Section 01010 Summary of Work for listing of specific governing codes.
 - 2. Health and Safety regulations
 - 3. Utility company regulations and recommendations governing temporary utility services.
 - 4. Police and Fire Department rules and recommendations.
 - 5. Police and Rescue Squad recommendations.
 - 6. Environmental protection regulations as to the use of water and energy, and the control of dust, noise and other nuisances.
- B. STANDARDS: Comply with the requirements of NFPA Cod 241 "Building Construction and Demolition Operations, the ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition: and the NECA National Joint Guideline NJG-6 "Temporary Job Utilities and Services".

PART 2 - PRODUCTS (Not applicable)

PART 3 - EXECUTION

3.1 GENERAL

- A. Storage yard: A portion of the site will be allowed for storage of materials and equipment. This area is to be fenced by the Contractor with a chain link

or similar type fence 6-feet high with gates. The entire site is currently fenced with chain link fence and locking gates.

- B. Illumination: Provide adequate illumination in all areas of construction and for all trades and for observation of the Work.
 - 1. Maintain in all areas until final completion.
- C. Heating:
 - 1. Furnish all heat required during new construction.
 - 2. Maintain newly installed equipment used for heating.
 - 3. Pay for fuel.
 - 4. Protect Owner's rights in full warranty on new equipment as if newly installed.
 - 5. Comply with all applicable fire safety codes.
- D. Fire Extinguishers: Provide hand carried, portable UL-rated Class A type fire extinguishers for use in temporary office, and Class ABC for field use with heating equipment and in temporary storage sheds. Comply with NFPA 10 and 241 for classification, extinguishing agent and size requirement by location and class of fire exposure.
- E. First Aid Supplies: Comply with governing regulations and recognized recommendations within the construction industry.
- F. Project bulletin board: Install and maintain during life of project a weathertight or protected bulletin board approximately 3 ft. high X 5 ft. long, mounted in a conspicuous location. Remove from site upon completion of project. At all times display the following items on the bulletin board.
 - 1. Equal Opportunity Poster.
 - 2. Applicable State Wage Rates.
 - 3. Safety requirements.
 - 4. Official notices or announcements.
 - 5. Copy of building permit.
 - 6. Other items as appropriate.
- G. Project Sign: Provide 4ft by 8ft exterior project sign mounted on ½" exterior plywood identifying the Project, Name, Owner, Architect and Contractor with addresses and contact information. Sign shall be color acrylic mounted and provided by the Sign Store located in Albuquerque, NM, Tele # (505) 830-2530. Sign shall be visible from Ranchitos Road, mounted on 4x4 wood posts. Sign layout and approval shall be obtained from Owner and Architect prior to ordering sign. Contractor shall pay for all costs associated with the Project Sign.

H. Site Maintenance:

1. Rigidly observe good housekeeping practices.
2. Maintain entire construction site in a clean and neat condition.
3. Inspect area daily and clean up debris as necessary to maintain neatness. Stockpile debris in designated areas and remove to off-site disposal area no less than once weekly.

I. Approved waste and excess cut material disposal sites:

1. Locate suitable site or sites.
2. Obtain required and necessary approvals.
3. Furnish copies of approvals to Architect.
4. Comply with all requirements of local health authorities.

3.2 **UTILITIES:**

A. Extend and maintain all utilities required during construction.

1. Electric energy for construction purposes will be furnished by the Owner. Contractor shall make arrangements with the Owner for temporary connection to existing power at existing facilities on site. Contractor shall provide all means of extending electric to places where required for construction purposes.
2. Water for construction purposes will be furnished by the Owner. Contractor shall make arrangements with the Owner for temporary connection to existing water at existing facilities on site. Contractor shall provide all means of conveying water to places where required for construction purposes.

3.3 **TEMPORARY ENCLOSURES:**

- A. Furnish weathertight enclosures for all exterior openings as soon as walls and roof are built. At end of each day's work, securely close and lock building for protection against all conditions of weather such as heat, cold, rain, etc.

3.4 **BARRICADES:**

- A. Erect and maintain all required barricades, lanterns, warning devices, etc. to comply with applicable provisions of Municipal, State and Federal Safety Laws, and as required to prevent public entry to the construction areas and to protect adjacent properties from damage during construction operations.
- B. Be responsible for any damage resulting from failure to provide.

- 3.5 **CONSTRUCTION FENCE:** The Contractor is to erect and maintain adequate construction fences to separate working areas from the balance of the premises during the duration of the project. Fence shall be of chain link with adequate supports for a stable installation.
- 3.6 **SHORING, ANCHORING AND BRACING:**
- A. Provide temporary shoring, anchoring and bracing required by the nature of the work in order to make all parts absolutely rigid and stable.
 - B. Be responsible for any damage resulting from failure to provide.
- 3.7 **REMOVAL OF TEMPORARY FACILITIES:**
- A. Remove temporary facilities progressively as need no longer exists.
 - B. Clean up debris.
 - C. Leave no trace of installations at end of project.

---END---

SECTION 01630

Substitutions

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- A. Submittals: Section 01300.
- B. Read all specifications thoroughly for specific data, samples, requirements, etc.

1.2 CONSIDERATION OF REQUEST:

- A. Requests for substitutions are to be submitted in strict accordance with the requirements of this section and all related sections. Substitutions will not be considered if:
 - 1. They are made outside the period of time here specified.
 - 2. They are incomplete according to the requirements here specified.
 - 3. They are indicated or implied on shop drawings or product data submittals without formal written request submitted in accordance with Paragraph 1.5.
 - 4. Acceptance will require revisions of Contract Documents without equitable reimbursement by Contractor to the Architect.
 - 5. The Contractor does not accept the burden of proof for demonstrating the substitute is “equal or greater than” the specified item or method.

1.3 SUBSTITUTIONS:

- A. During bidding: (Prior approval)
 - 1. During bidding, Architect will consider written requests for substitutions from Prime Bidders received at least ten days prior to bid date; requests received after that time will not be considered.
 - 2. If Architect approves any substitution, such approval will be set forth in an addendum in accordance with Sections 3.3 and 3.4 of Instructions to Bidders.
- B. Under contract: Architect will consider requests from the Contractor for substitution or products in place of those specified only if specified material and/or procedures is no longer available. Requests must be made in writing and be submitted within 15 days after date of Contract.

1.4 **REQUEST: (PRIOR APPROVAL)**

- A. Prior approval request: Submit five copies of request for substitution. Include in request:
1. Complete data substantiating compliance of proposed substitution with Contract Documents.
 2. For products:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature:
 - (1) Product description.
 - (2) Performance and test data.
 - (3) Reference standards.
 - c. Samples.
 - d. Written itemized comparison of proposed substitution with specified product which identifies the essential similarities/differences in design, construction, finish, operation, features, etc.
 - e. Names and addresses of at least five recent projects in which this product was used, and date of installation.
 - f. The prime bidder's signed statement that this product is "equal to or greater than" the specified product and that he accepts the "burden of proof" to demonstrate this quality.
 3. For construction methods:
 - a. Detailed description of proposed method.
 - b. Drawing illustration methods.

1.5 **REQUEST (UNDER CONTRACT):**

- A. Under contract request: In addition to the requirements as indicated under 1.4 Item A above, the Contractor shall include in his request:
1. Data relating to changes in construction schedule.
 2. Relation to separate contracts.
 3. Accurate cost data on proposed substitution in comparison with product or method specified.

1.6 **IN MAKING REQUEST FOR SUBSTITUTION, BIDDER/CONTRACTOR REPRESENTS:**

- A. That the Owner will receive credit if the substitution proposed results in any savings.
- B. He has personally investigated proposed product or method and determined that it is equal or superior to that specified in all respects. He accepts the "burden of proof" for the substitution.

- C. He will provide the same guarantee for substitution as for product or method specified.
- D. He will coordinate installation of accepted substitution into work, make such changes as may be required for work to be completed in all respects.
- E. He waives all claims for additional costs related to substitution which subsequently become apparent.
- F. Cost data is complete and includes all related costs under his contract, but excludes:
 - 1. Cost of separate contracts.
 - 2. Architect's redesign.

---END---

SECTION 01700

Contract Closeout

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS SPECIFIED ELSEWHERE:

- A. Time of Final Payment: The Agreement.
- B. Completion: Waiver of Claims: General Conditions.
- C. Liquidated Damages: supplementary Conditions.
- D. Payments and Completion: General Conditions and Supplementary Conditions.
- E. Spare Parts and Maintenance Materials: Respective sections of Specifications.
- F. Closeout Submittals Required of Trades: Respective sections of Specifications.

1.2 SUBSTANTIAL COMPLETION:

- A. Contractor:
 - 1. Submit written certification to Architect, that project or designated portion of the project, is substantially complete.
 - 2. Submit list of major items to be completed or corrected.
- B. Architect will review project within seven days after receipt of certification, together with Owner, User, Contractor and major Sub-contractors.
- C. Should Architect consider that work is substantially complete:
 - 1. Contractor shall prepare, and submit to Architect, a list of items to be completed or corrected, as determined by the review.
 - 2. Architect will prepare and issue a Certificate of Substantial Completion, containing:
 - a. Date of Substantial Completion.
 - b. Punch List of items to be corrected or completed, verified and amended by the Architect.
 - c. The time within which the Contractor shall complete or correct the listed items.

- d. Time and date Owner will assume possession of work or designated portion thereof.
 - e. Responsibilities of Owner and Contractor for:
 - (1) Insurance.
 - (2) Utilities.
 - (3) Operation of mechanical, electrical, and other systems.
 - (4) Maintenance and cleaning.
 - (5) Security.
 - f. Signatures of:
 - (1) Architect.
 - (2) Contractor.
 - (3) Owner.
- 3. Owner occupancy of project or designated portion of project:
 - a. Contractor shall:
 - (1) Obtain certificate of occupancy.
 - (2) Perform final cleaning.
 - b. Owner will occupy project, under provisions stated in Certificate of Substantial Completion.
 - 4. Contractor: Complete work listed for completion or correction, within designated time.
- D. Should Architect determine that the Work is not Substantially Complete:
- 1. He shall immediately notify Contractor, in writing stating reasons.
 - 2. Contractor shall complete work and send second written notice to Architect certifying that project or designated portion of project is substantially complete.
 - 3. Architect will again review work.

1.3 **FINAL INSPECTION:**

- A. Contractor shall submit a written certificate that:
 - 1. Contract Documents have been reviewed.
 - 2. Project has been inspected for compliance with the Contract Documents.
 - 3. Work has been completed in accordance with the Contract Documents.
 - 4. Equipment and systems have been tested in presence of Owner and are operational.
 - 5. Project is completed and ready for final inspection.
- B. Architect will review project within seven days after receipt of certification together with Owner, Contractor and major Sub-contractors.
- C. Should Architect determine that work is finally complete in accordance with the Contract Documents, he shall request that Contractor make Project Closeout Submittals.

- D. Should Architect determine that work is finally complete:
1. He shall notify Contractor, in writing, stating reasons.
 2. Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to Architect certifying that Work is complete.
 3. Architect will again review work.

1.4 **REINSPECTION COSTS:**

- A. Should Architect be required to perform second or subsequent reviews because of failure of work to comply with original certifications for substantial completion or final completion of Contractor, Owner will compensate Architect for additional services, and deduct amount paid from final payment to Contractor.

1.5 **PROJECT RECORD DOCUMENTS:**

- A. Project Record Documents shall include the following items with red penciled markings showing all changes and the final locations of utilities, including all changes be addendum, field order or change order.
1. Contract Drawings
 2. Specifications
 3. Shop Drawings
 4. Addenda
 5. Change Orders
 6. Field Orders
- B. Store and file Project Record Documents for easy recording of changes in job site field office. Store separately from documents used for construction and do not use for construction purposed.
- C. Keep Project Record Documents current and record changes and locations of concealed work before work is permanently covered.

1.6 **CLOSEOUT SUBMITTALS:**

- A. Deliver directly to Architect the following items:
1. Project record documents
 2. Operation and maintenance data: 3 sets.
 3. Guarantee and bond: 3 sets.
 4. Final approved test and balance reports.

- B. Deliver directly to Owner the following items:
 - 1. Keys and keying schedule: All keys tagged and identified.
 - 2. Deliver evidence of compliance with requirements of governing authorities:
 - a. Certificates of inspection.
 - b. Certificate of occupancy.
- C. The following submittals shall be fully executed before delivery to the Architect:
 - 1. Contractor's Affidavit of Payment of Debts and Claims (AIA G706).
 - 2. Contractor's Affidavit of Release of Liens (AIA G706A).
 - 3. Consent of Surety to Final Payment (AIA G707).
 - 4. Contractor's Release of Waiver of Liens (in letter form).
 - 5. Separate Release of Waivers of Liens for subcontractors, suppliers, and other with liens rights against property of Owner together with list of those parties.

1.7 **INSTRUCTION:** Prior to Closeout, arrange and schedule an instructive seminar for Owner's personnel in operation and maintenance of all systems, mechanical, electrical, and other equipment by qualified personnel. Provide written documentation to Architect, with copy sent directly to Owner, of date of training seminar and names of staff members trained.

1.8 **FINAL CLEANING:**

- A. Clean all surfaces thoroughly as required by other sections of these specifications.
- B. Maintain cleaning until project, or portion thereof, is occupied by the Owner.
- C. Broom clean exterior paved surfaces. Rake clean other surfaces or grounds.
- D. Remove all waste materials, debris and rubbish from site and legally dispose of at public or private dumping area off the Owner's property.

1.9 **FINAL ADJUSTMENT OF ACCOUNTS:**

- A. Submit final statement of accounting to Architect.
- B. Statements to reflect all adjustments.
 - 1. Original contract sum.

2. Additions and deductions resulting from:
 - a. Previous Change Orders.
 - b. Unit prices.
 - c. Deductions for uncorrected Work.
 - d. Deductions for liquidated damages.
 - e. Deductions for reinspection payments.
 - f. Other adjustments.
3. Total Contract sum, as adjusted.
4. Previous Payments.
5. Sum remaining due.

C. Submit other documents as required by General Supplementary, and/or Additional Conditions.

D. Architect will prepare final Change, Order, reflecting approved adjustments to Contract Sum not previously made by Change Orders.

E. Architect will prepare the Certificate of Final Completion, page 00800-21.

1.10 **FINAL APPLICATION AND CERTIFICATE FOR PAYMENT:**

A. Contractor, shall submit final application in accordance with requirements of General, Supplementary, and/or Special Conditions.

1.11 **WARRANTY REVIEW:**

A. Review of the Project

1. Approximately one month prior to the first anniversary date of Substantial Completion, the Architect will schedule and make a review the project in company of Owner. User and Contractor to determine whether correction of work is required, in accordance with provisions of the General Conditions.
2. Architect will promptly notify the Contractor, in writing, of any observed deficiencies which require correction.

B. Correction of Work

1. The Contractor shall correct all items within fourteen days or provide Architect with written explanation and schedule for completion.
2. Expiration of warranties shall not be cause for release of Contractor's obligation to perform any of this Correction of Work.
3. Correction of items at this time shall not release the Contractor from obligations under any warranties, guarantees, or statute of limitations extending beyond the anniversary date of Substantial Completion.

4. Contractor shall submit a written certificate that corrections have been completed.

C. Review of the Corrections

1. The Architect will schedule and make a review of the project in company of Owner, User and Contractor to verify that the corrections of work have been completed.
2. Any further reviews of corrections because of failure of work to comply with original certification will be made at the cost of the Contractor.

D. Final Cleaning. Remove litter and debris and provide final cleaning of the corrections work area.

---END---

SECTION 02000

Demolition

1. GENERAL PROVISIONS

The provisions of Division 1 shall apply to the work of this section.

2. WORK INCLUDED

Furnish all labor, materials, tools and equipment required to perform the work of this section as shown on the Drawings and/or as specified herein. In general, the work shall include but not necessarily be limited to the following:

- a. Obtain and pay for all permits necessary to perform the work of this section.
- b. Erect all temporary barriers required for the protection of the general public, utility structures and equipment, adjoining property, and existing trees.
- c. Removal of all debris resulting from demolition operations and all existing debris throughout entire space.
- d. Demolition of items as designated on the Drawings.
- e. Locate demolition equipment throughout the site and structure and remove materials so as not to impose excess loads to supporting roof areas, walls, floors, or framing.
- f. Do not burn combustible material on Owner's property.
- g. Control air pollution caused by dust and dirt; comply with governing regulations.
- h. Plug and/or disconnect all utility services that are to be demolished or abandoned.
- i. Removal and protecting of items indicated to be saved undamaged for reuse.
- j. Excavation and preparation of area for new buildings & sidewalks.
- k. Provide four 10'x30' steel storage containers for use by the four Homeowners for a period of the duration of construction. Assist Homeowners with moving items into and out of containers. Locate containers as directed by Pueblo staff.

3. RELATED WORK SPECIFIED UNDER OTHER SECTIONS

The Contractor will be required to coordinate the related work of other sections with the work of this section and be responsible for the timely and expeditious performance of same.

31000- Earthwork

32000- Exterior Improvements

4. **VERIFYING CONDITIONS**

- a. Examine all drawings covering the work of this section and refer to all other drawings, including mechanical and electrical drawings, which may affect the work of this section or require coordination by name.
- b. Before starting any work, examine existing conditions, and thoroughly check drawings, specifications, available underground utility information adjoining or underlying conditions in which the work of this section is to be performed, and all dimensions.
- c. Report in writing to the Owner with a copy to the Architect, any and all conditions which may interfere with or otherwise affect or prevent the proper execution and work of this section. Do not commence any work until any and all conditions have been corrected by the trade or trades responsible.
- d. Failure to notify the Owner and/or Architect of unsatisfactory conditions will be construed as an acceptance of all conditions.
- e. Execution of work of this section constitutes acceptance of the base or adjoining work and other conditions as satisfactory in every respect and later claims of defects in such cases will not be allowed.

5. **GENERAL REQUIREMENTS**

- a. The Contractor's particular attention is directed to existing utilities at the site, including water mains, sewers, manholes, telephones, etc., which must be protected as part of the work of this section.
- b. The Contractor shall accept the premises as he finds them and shall clear the site, as herein specified. The Owner assumes no responsibility for the condition of the buildings and structures on the premises covered by these Specifications, nor their continuance in the condition existing at the time of the award of the Contract.
- c. All work including removal of debris shall be done in a careful manner so as not to damage any retained work: architectural features, sills, etc. All retained joists, masonry, etc., shall be kept clean and in as undamaged condition as possible.

6. **PROTECTION OF EXISTING WORK**

- a. Provide temporary enclosures, fencing guards, railings, etc., including temporary sidewalk shed for adequate protection of workmen and for protection of the public from injury. Apply protections to adjacent property as required to maintain safe

conditions. Comply with all New Mexico Building Department requirements for protection of the general public.

- b. Periodically during the course of demolition, all work shall be wet down to minimize dust.

7. **PROTECTION OF ADJACENT STRUCTURES AND PROPERTY**

- a. Demolition and the removal of debris shall not infringe upon adjoining properties.
- b. Demolition and excavation work must be performed in such a manner as to protect adjacent structures from any and all damage or settlement. Shoring and bracing shall be performed by a reputable subcontractor with a minimum of 10 years experience with similar demolition and excavation projects.
- c. During the demolition near any sidewalks, temporary routing must be provided from adjoining properties to and around the construction site.

8. **EXTERMINATION**

All portions of the building area shall be thoroughly freed by destruction and control from any and all insects, rodents, or other known or unknown pests. All necessary precautions shall be taken to protect life, health, and property as required by the local Health Code.

9. **MAINTAINING TRAFFIC**

The Contractor shall not close or obstruct streets, sidewalks, or passageways. The Contractor shall provide or maintain at his own expense all lights, barriers, public and pedestrian protection, etc., that may be required by good practice and local law.

10. **UTILITY LINES**

The Contractor shall carefully backfill and tamp any street openings made for the removal of water taps, or for any other purpose. The Contractor shall carry on the work in strict accordance with all local laws and regulations.

11. **FEES, PERMITS, ETC.**

The Contractor shall at his own expense, secure and pay for all permits, street cuts, pavement restoration and any other fees necessary and/or required by local laws and any agency having jurisdiction.

12. **CARTING AND REMOVING OF DEBRIS AND CLEANUP**

- a. All debris, resulting from the operations and any other material found on premises under this Contract, shall be immediately removed from the site and shall not be

stored or permitted to accumulate on the site. All removed material shall be disposed of into containers in accordance with all related laws and regulations.

- b. Upon completion of the work under this contract, the Contractor shall remove all tools, equipment, materials, apparatus, etc., and shall leave the premises broom clean, neat and orderly, to the entire satisfaction of the Owner. Contractor shall clean any adjacent structures and property that have been affected by his work.

---END OF SECTION---

SECTION 03000

Concrete

PART 1 - GENERAL

1.1 **GENERAL CONDITIONS:**

The provision of Section 1 shall apply to this section.

1.2 **SCOPE:**

The work of this section consists of furnishing all labor, materials, equipment, and appliances necessary or required to perform and complete all concrete work as shown on the Drawings, as specified herein, and as necessary for the proper execution of all related work for the entire project, but shall not necessarily be limited to the work outlined in the following sections.

1.3 **WORK INCLUDED:**

- A. Provide new concrete slabs, footings, sidewalks and other concrete members as indicated on Drawings.
- B. Formwork of every description as required by job.
- C. Finishing of slabs as indicated on Drawings.
- D. Perform all testing of concrete and laboratory tests as may be required by the State of New Mexico and Pueblo Building Codes, latest editions.
- E. All other labor and materials reasonably to be inferred as needed to make all work in this section complete.

1.4 **WORK OF OTHER SECTIONS:**

- A. 03100 Concrete Formwork
- B. 03200 Concrete Reinforcement

1.5 **VERIFYING CONDITIONS:**

- A. Examine all Drawings covering the work of this section and refer to all other Drawings, including mechanical and electrical drawings that may affect the work of this section or require coordination by same.
- B. Report in writing, to the Owner with a copy to the Architect, any and all conditions that may interfere with or otherwise affect or prevent the proper execution and completion of the work of this section. Do not commence any work until any and all such prevent the proper execution and completion of the work of this section. Do not commence any work until any and all the trade or trades responsible have corrected such conditions.

1.6 **SHOP DRAWINGS AND SAMPLES:**

Submit for approval samples of materials, test reports, records of all pertinent information, affidavits, certificates, etc., as required by the General Conditions or requested by the Architect.

PART II-PRODUCTS:

2.1 **MATERIALS:**

- A. Cement – Portland Cement, meeting all requirements for ASTM C-150 Type 1 or 2 Cement.
- B. Sand – Fine aggregate shall consist of sand, stone screening other inert material with similar characteristics, or a combination thereof, having clean, hard, strong, durable uncoated grains and free from injurious amounts of dust, lumps, loam, or other deleterious substances.
- C. Aggregates: ASTM C 33, and the following:
 - 1. Coarse Aggregates: Gravel or crushed rock; clean and uncoated processes aggregate containing no clay, mud, loam, or foreign matter, size 467, unless otherwise shown or specified. Blast furnace slag, weighing not less than 70 lbs. Per cu. Ft. when determined in compliance with ASTM C 29, may be used for coarse aggregate at Contractor's option.
 - 2. Fine Aggregate: Clean, sharp, natural or artificial sand, free from loam, clay lumps, or other deleterious substances; fineness modulus not less than 2.5 nor more than 3.0, unless otherwise acceptable.
 - 3. Provide all aggregates from a single source, and of accepted materials, unless otherwise permitted by the Architect. Use natural aggregates that, when subjected to 5 cycles of the sodium sulfate soundness test of ASTM C 88, have a weight loss of not more than 15%.
- C. Water – Water for concrete shall be clean and free from oil, mold, alkali, organic matter or other deleterious substances and shall be potable.

PART III – EXECUTION:

3.1 **CONCRETE MIXING:**

- A. General: Concrete may be mixed at batch plants or it may be mixed as specified herein. Batch plants must comply with the requirements of ACI 614, with sufficient capacity to produce concrete of the specified qualities and quantities required to meet the construction schedule.
- B. Job Site Mixing: Mix all materials for concrete in an acceptable drum type batch machine mixer. For mixers of one cu. Yard or smaller capacity, continue mixing

at least 1 & ½ minutes of mixing time by 15 seconds for each additional cu. Yd., or fraction thereof.

Do not exceed the catalog rating or nameplate capacity for the total volume of materials used per batch. Equip the mixer with automatic controls, or semi-automatic controls if acceptable, for proportioning materials, and the proper measured quantities. Do not exceed 30 minutes total elapsed time between intermingling.

- C. Ready – mix Concrete: Comply with the requirements of ASTM C 94, and as herein specified, provided the quantity and rate of delivery will permit unrestricted progress of the work in accordance with the placement schedule. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required as specified below. Proposed changes in mixing procedures, other than herein specified, must be accepted by the Architect before implementation.

3.2 **PLACING OF CONCRETE:**

- A. Concrete shall not be placed until excavations, bearing soil and forms are clear of all debris and water, and until inspection and approval of forms and reinforcing steel. All reinforcement sleeves, anchor bolts and similar items, and all mechanical and electrical installations within or under concrete work shall have been installed, inspected, and approved prior to placing or concrete.
- B. All forms must be absolutely clean before starting concreting.
- C. All concrete must be placed as soon as possible after mixing and thoroughly vibrated, rodded, spaded, or tamped in place. All concrete shall be placed with the aid of suitable tools or vibrating equipment. The “vibration” shall be applied directly to the concrete. The vibration shall be sufficient to cause flow or settlement of the concrete into place, without separation of fines.
- D. When depositing concrete at temperatures below 40°F., the concrete shall have a temperature of at least 50°F., but not more than 70°F. for not less than 72 hours after placing, or until the concrete has thoroughly hardened. When necessary, concrete materials shall be heated before mixing; no frozen material, or materials containing ice or snow shall be used.

3.3 **CURING:**

- A. Concrete shall be protected adequately from loss of surface moisture and from injurious action by sun, rain, flowing water, frost, and mechanical injury for a period of at least 7 days after placing; curing operations shall commence after the concrete has attained its initial set but not later than ten hours after placing.

3.4 **SLABS ON GROUND:**

For all non-framed slabs on grade:

- A. Place concrete so as not to exceed a 40' length of pour in any direction. Do not place concrete for at least three days after or until concrete in adjacent bays has hardened and shrinkage takes place. Provide suitable construction joints.
- B. Use 6" x 6" 10/10 welded wire mesh.
- C. Provide six inches of minimum thickness of approved well-compacted porous granular fill under new slabs unless existing approved granular material is found at the site in the areas directly below the slabs.

3.5 WORK IN CONNECTION WITH OTHER TRADES:

- A. The Contractor shall coordinate this work with the other phases of the construction. He shall afford all cooperation and access to the setting of sleeves for such piping as may pass through new slabs and walls. He shall receive and set all miscellaneous metal work items specified herein, furnished under Section 5A. Set all sleeves, boxes, dowels, bolts, anchors, and similar items as shown on the Drawings to be work embodied in this section.
- B. Furnish and install all required wood blocking and grounds of spruce or fir, properly anchored, to be built-in with concrete to receive the work of other trades, where required.

3.6 CONCRETE FINISHING:

- A. Perform concrete finishing using machine or hand methods as required.
 - 1. After striking off and consolidating concrete, smooth the surface by screening and floating, use hand methods only where mechanical floating is not possible. Adjust the floating to compact the surface and produce a uniform texture.
 - 2. After floating, test surface for trueness with a 10' straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous, smooth surface.
- B. All exposed and cured concrete surfaces shall be without voids. Where honeycombs appear, the loose aggregate shall be removed and the voids filled with cement mortar. After removal of fins, bring rough surfaces to smoothness by rubbing and troweling.
- C. Repair all existing concrete walls, pavements, steps, etc., at all locations shown on the drawings and to the extent required by the actual field conditions.

3.7 CUTTING AND PATCHING

- A. All existing damaged concrete work or damaged as a result of demolitions and removals shall be patched and repaired as part of the work of this section.
- B. Cutting and patching necessary to the proper fitting and completion of the work of other trades and sections shall be performed as part of the work of this section.

- C. Cutting shall include the removal of whole sections, raking out cracks, replacing missing work, and generally preparing existing surfaces for proper completion.
- D. Patching shall be with an approved mix for the work intended with color blended to approximate existing finishes.

3.8 **CLEAN-UP**

- A. Remove all rubbish from installation of the work of this section. Clean all adjoining surfaces of smudges, dirt or grime resulting from same. Repair and or replace materials and finishes damaged as a result of this installation.
- B. Remove and dispose of all excess and/or unused concrete in a manner approved by the Architect.

3.9 **GUARANTEE**

All work performed under this section shall be guaranteed as provided under the general conditions.

---END---

SECTION 03100

CONCRETE FORMWORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Included in this section are requirements for the construction, installation and removal of concrete formwork.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

Work related to work specified in this section includes but is not limited to the following.

A. Earthwork	Section 02201
B. Concrete Reinforcement	Section 03200
C. Cast-In-Place Concrete	Section 03300

1.3 QUALITY ASSURANCE:

A. Conform to the latest edition of ACI 347 "Recommended Practices for Concrete Formwork".

B. Notify Architect before placing steel or concrete.

1. Forms and formwork are subject to inspection or concrete.
2. Damaged or improperly installed formwork will be rejected and shall be replaced.

1.4 JOB CONDITIONS:

A. Work sequence: Cooperate with other trades so that all necessary inserts, sleeves, anchors, and any other miscellaneous embedded metal items are properly installed prior to placement of concrete.

1.5 SUBMITTALS:

A. Manufacturer's literature on crushable fiberboard forms.

PART II PRODUCTS:

2.1 GENERAL:

A. Wood Forms:

1. Unexposed concrete surfaces: No. 2 common or better.
2. Exposed concrete surfaces: New plywood linings or new plywood formings. Used plywood in good condition may be utilized if approved by Architect.

B. Metal Forms: Capable of shaping concrete to required dimensions without undue dents and deformations and as approved by Architect.

C. Crushable Forms: Chemically treated corrugated fiberboard forms, 6 inches deep by width of grade beam. "Jay-Voids: as manufactured by the Jayhawk Fiber Form Company of Lawrence, Kansas or approved equal.

D. Form Oil: Non-staining mineral oil.

E. Form ties: Commercial product, length as required, fixed or adjustable type manufactured to leave no steel within 1 inch of surface of concrete after removal.

PART III EXECUTION:

3.1 INSTALLATION

A. Install in accordance with the latest edition of ACI 347.

B. Construct forms to give shapes and dimensions indicated and to give resultant sharp, true lines to exact intent of design indicated or detailed.

C. Install forms tight, rigid and adequately braces to prevent deformation under load.

D. Install crushable forms under all grade beams.

E. Chamfer exposed corners and edges to $\frac{3}{4}$ inch or as indicated on the drawing.

F. Form all vertical surfaces including sides of footing. Hold a straight, true vertical face.

G. Do not use any form treatments containing ingredients that may stain or otherwise injure the concrete or prevent a good bond for subsequent coatings, if any.

H. Keep all forms thoroughly clean.

3.2 **CONCRETE INSERTS:**

Ensure that all concrete inserts are properly placed and securely anchored against displacement during pour.

3.3 **REMOVAL OF FORMS:**

- A. Non-Supportive Formwork: Formwork not supporting weight of concrete, such as sides of slabs, beams, walls, columns and similar parts of the work may be removed 48 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Supportive Formwork: Formwork supporting weight of concrete, such as beam soffits, joint, slab and other structural elements shall not be removed in less than 14 days or until concrete has attained 85% of design compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of location of members.
- C. Facing Material: Form facing material may be removed 48 hours after placement of shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.
- D. Form Removal:
 - 1. Obtain Architect's approval before removal.
 - 2. Remove forms with care, in a manner that will not jeopardize the safety of the structure.
- F. Unauthorized Removal: Damage caused by premature and unauthorized removal shall be corrected and repaired at no cost to the Owner.

3.4 **FIELD INSPECTION:**

- A. Notify Architect and request field inspection and approval 24 hours in advance for the following:
 - 1. Form installation.
 - 2. Placement of steel and inserts.

3. Form removal.

- B. Do not proceed with next phase until Architect's approval has been obtained in each case.

---END---

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK:

A. Included in this section are requirements for the fabrication and placement of reinforcement for precast and cast-in-place concrete, including deformed bars, welded wire fabric, ties and supports

1.2 RELATED WORK SPECIFIED ELSEWHERE: Work related to work specified in this section includes but is not limited to the following.

A. Concrete Formwork:	Section 03100
B. Cast-in-Place Concrete	Section 03300

1.3 QUALITY ASSURANCE:

A. Examine the substrate and the conditions under which concrete reinforcement is to be installed and notify Architect in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.

B. Codes and Standards: Comply with requirements of the latest editions of the following codes and standards, except as herein modified. Except as specifically stated otherwise, the latest edition or revision of each document shall be used.

1. American Concrete Institute (ACI).
 - a. ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures".
 - b. ACI 318, "Building Code Requirements for Reinforced Concrete".
2. American Welding Society (AWS).
 - a. AWS D1.4, "Structural Welding Code-Reinforcing Steel".
3. Concrete Reinforcing Steel Institute (CRSI).
 - a. "Manual of Standard Practice".
 - b. "Placing Reinforcing Bars".
4. American Society for Testing and Materials (ASTM): ASTM standard specifications and methods are referred to in the following paragraphs by their serial numbers as applicable.

1.04 SUBMITTALS:

- A. General: Comply with requirements of Section 01340, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
- B. Manufacturer's Data: Submit manufacturer's specifications and installation instructions for all proprietary materials and reinforcement accessories.
- C. Shop Drawings: Show fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 showing bar schedules, stirrup spacing, diagrams of bent bars, arrangements and assemblies, as required for the fabrication and placement of concrete reinforcement. Include special reinforcement required at openings through concrete structures.
- D. Mill Certification: For information only, submit two (2) copies of steel producer's certificates of mill tests for reinforcing steel.

1.05 PRODUCT, DELIVERY, HANDLING AND STORAGE:

- A. Deliver reinforcement to the project site bundled, tagged and marked. Use tags indicating bar size, lengths and other information corresponding to marking shown on placement diagrams.
- B. Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt or excessive rust.

PART II PRODUCTS:

2.01 MATERIALS:

- A. Reinforcing Bars: ASTM A 615, deformed, Grade 60 except that Grade 40 may be used at Contractor's option for stirrups and ties.
- B. Steel Wire: ASTM A 82.
- C. Welded Wire Fabric: ASTM A 185, furnished in rolls or flat sheets.
- D. Supports for reinforcement: Provide bolsters, chairs, spacers and other devices as required for spacing, supporting and fastening reinforcement in place. Use wire bar supports complying with the Bar support Specifications contained in the CRSI Manual of Standard Practice. Do not use wood, brick, or other unacceptable materials.
 - 1. For slabs on grade, use supports with sand plates or horizontal runners where wetted base materials will not support chair legs.

2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, and for sandblasted or bush-hammered concrete provide supports with legs which are plastic protected (CRSI Class 1 protection) or which have stainless steel tips (CRSI Class 2 protection).
3. Over waterproof membranes, use precast concrete chairs to prevent penetration of the membrane.

2.02 MISCELLANEOUS REINFORCING: Provide an allowance to cover material, fabrication and placing of one-half ton of reinforcing bars (ASTM A 615, grade 60, deformed) for use on the project without additional cost to the Owner as directed by the Architect. Credit for any unused reinforcing shall be given by the Contractor to the Owner by change order.

PART III EXECUTION:

3.01 FABRICATION:

- A. General: Shop-fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with ACI 315. In case of fabricating errors, do not re-bend or straighten reinforcement in a manner that will injure or weaken the material.
- B. Unacceptable Materials. Reinforcement with any of the following defects will not be permitted in the work:
 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
 2. Bends or kinks not indicated on drawings or final shop drawings.
 3. Bars with reduced cross-section due to excessive rusting or other cause.

3.02 INSTALLATION:

- A. Comply with the Concrete Reinforcing Steel Institute recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports except as otherwise shown on the drawings.
- B. Clean reinforcement to remove loose rust and mill scale, earth, ice and other materials, which reduce or destroy bond with concrete.
- C. Position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required and to provide clearance indicated on drawings.
- D. Place reinforcement at the position shown on the drawings and as required to obtain required concrete coverages within the tolerances specified in ACI 315. Arrange,

space and securely tie bars and bar supports together with 16 gauge wire to hold reinforcement accurately in position during concrete placement operations. Set wire ties so that ends are directly away from exposed concrete surfaces.

- E. Install welded wire fabric in lengths as long as practicable. Lay adjoining pieces at least one-and-one half full meshed and lace splices with 16-gauge wire. Do not make end laps midway between supporting beams, or directly over beams of continuous structures. Offset end laps in adjacent widths to prevent continuous laps.
- F. Provide sufficient numbers of supports with strength adequate to carry reinforcement. Do not place reinforcing bars more than 2 inches beyond the last leg of any continuous bar support. Do not use supports as bases for runways for concrete conveying equipment and similar construction loads.
- G. Provide standard reinforcement splices by lapping ends, placing bars in contact and wire tying tightly. Comply with requirements of ACI 318 for minimum lap of spliced bars except as otherwise shown on the drawings.
- H. Field welding of reinforcing is not necessary on this project. Do not field weld without the prior approval of the Architect. If field welding of reinforcing is approved, comply with the requirements of AWS d1.4 for field welding. Prior to field welding, determine the weldability of reinforcing bars by a laboratory chemical analysis of steel. Only steel conforming to the chemical requirements specified in AWS d1.4 may be welded.

---END---

SECTION 04210
UNIT MASONRY AND ADOBE

Part One: General

1.01 GENERAL PROVISIONS

The provisions of Section 1 shall apply to the work of this Section.

SCOPE

Furnish all labor, materials, tools and equipment required to perform all masonry work of this Section as shown on the Drawings and/or as specified herein, and as necessary for the proper execution of all related work for the entire project, but shall not necessarily be limited to the work outlined in the following section.

1.03 WORK INCLUDED

- a. Install all concrete block and mortar work as shown on the Drawings and as required to complete the project as designed.
- b. Receive and build in all items furnished by other trades and/or sections, including inserts, anchors, etc.
- c. Furnish and install all adobe brick work and mortar as indicated on the Drawings.
- d. Furnish and install all wall reinforcing, ties and anchors, etc. necessary to complete the work.
- e. In addition to materials and accessories specified herein any materials, accessories or scaffolding not mentioned but normally required for the proper completion of the work shown on the Drawings or described here shall be furnished and installed.
- f. Installation of Adobe flooring and repairs as indicated on the Drawings.
- g. Coordinate the work of this Section with all other trades.

Part Two: Products

2.01 MATERIALS

All mortar and its components shall meet or equal the following tests and standards:

- a. Portland Cement ASTM C150-67 Type I or II
- b. Hydrated Lime ASTM C 206 or 207 Type S
- b. Setting Mortar: 1 part ASTM-C150 Portland cement Type I or II, 1 1/2 part high-calcium lime putty or type S hydrated lime ASTM C206 or 207, and 4 to 4-1/2 parts water.
- c. Reinforcements: Anchors and ties shall be approved zinc coated types and sizes as required by conditions. All material except as otherwise specified herein shall be zinc coated steel conforming to ASTM specification A 153. Class B-1, B-2, or B-3 as required.
- d. Masonry wire ties: 3/16" cold-drawn steel wire, with 1.5 oz. hot-dip zinc coating or 7-mil copper coating, Z-shaped for solid unit masonry, rectangular shape for hollow unit masonry , adjustable type where wythe courses are not aligned.

- e. Miscellaneous Masonry Anchors: Fabricated from 16 gauge steel sheet or 3/8" steel rod, 1.5 oz. hot-dip zinc coat after fabrication.
- f. Adobes shall be as manufactured by NM Earth Adobes, (505) 898-1271 or approved equal.
- g. Adobe dirt for flooring areas shall be as provided by NM Earth Adobes or approved equal.

Part Three: Execution

3.01 GENERAL REQUIREMENTS

- a. Mortars shall be mixed by machine. Ingredients shall be measured by volume and thoroughly mixed in the exact proportions specified. No admixture shall be added to the mortar. Mortar shall be mixed to the right consistency. Later re-tempering is not to be permitted. All containers used for mortar and all tools used for placing mortar shall be kept clean. Mortar shall properly harden without freezing. No admixtures shall be added to reduce the freezing temperature.
- c. No masonry shall be erected when the temperature is below 32 degrees F, unless special provisions are made for heating the materials and protecting the work by providing and maintaining the temperature above 40 degrees F on a falling thermometer at the place where work is in progress during and for 48 hours subsequent to lay-up. No anti-freezing admixtures shall be used. No exposed exterior masonry shall be erected when temperature is above 90 degrees F. All work shall be free from damage and frost.
- d. Setting: No frozen work shall be built upon. No masonry units having a film of frost on their surface shall be laid in the portion of project concerned.
- e. Stone Veneer system shall be installed over metal lath, 2 coat stucco, set in mortar without grout joints as per the Drawings and the manufacturer's recommendations.

3.02 GURANTEEE

- a. All work shall be guaranteed for a period of one year from the date of Substantial Completion.

END OF SECTION 04210

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes structural steel.

1.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer structural steel connections required by the Contract Documents to be selected or completed by the fabricator to withstand design loadings indicated.
- B. Engineering Responsibility: Engage a fabricator who utilizes a qualified professional engineer to prepare calculations, Shop Drawings, and other structural data for structural steel connections.

1.4 SUBMITTALS

- A. General: Submit each item in the Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data: For each type of product indicated.
- C. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - 3. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify high-strength bolted slip-critical, direct tensioned shear/bearing connections.
 - 4. Include Shop Drawings signed and sealed by a qualified professional engineer responsible for their preparation.
- D. Welding certificates.
- E. Mill test reports.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category Sbd.
- B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- C. Comply with applicable provisions of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
- D. Professional Engineer Qualifications: A professional engineer who is legally authorized to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

- A. Plate and Bar: ASTM A 36/A 36M.
- B. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- C. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
- D. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 - 1. Finish: Hot-dip zinc coating, ASTM A 153, Class C.
- B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.
- C. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
 - 1. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- D. Headed Anchor Rods: ASTM F 1554, Grade 36.
 - 1. Finish: Hot-dip zinc coating, ASTM A 153, Class C.
- E. Threaded Rods: ASTM A 193.

1. Finish: Hot-dip zinc coating, ASTM A 153, Class C.

2.3 PRIMER

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

2.4 GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
- B. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
- B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
 2. Surfaces to be field welded.
 3. Surfaces to be high-strength bolted with slip-critical connections.
 4. Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
 1. SSPC-SP 2, "Hand Tool Cleaning."

- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

PART 3 - EXECUTION

3.1 ERECTION

- A. Examination: Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
- C. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
 - 1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of base plate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base plate before packing with grout.
 - 4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- D. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.2 FIELD CONNECTIONS

- A. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

END OF SECTION 05120

SECTION 05500

METAL FABRICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. The extent of miscellaneous metal work is shown on the drawings and includes items fabricated from aluminum, iron and steel shapes, plates, bars, strips, tubes, pipes and castings which are not a part of the structural steel or other metal systems in other sections of these specifications.
- B. The types of miscellaneous metal items include, but are not limited to, the following:
 - 1. Miscellaneous steel and aluminum furring, framing and supports.
 - 2. Miscellaneous steel and aluminum trim.
 - 3. Miscellaneous metal manufactured items.

1.2 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with the provisions of the latest edition or revision of the following codes, standards and specifications, except as otherwise shown and specified.
 - 1. AISC “Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings,” including the “Commentary on the AISC Specifications”.
 - 2. AISC “Specification for the Design of Cold-Formed Steel Structural Members”.
 - 3. AWS D1.1, “Structural Welding Code”.
 - 4. ASTM A 6, “General Requirements for Delivery of Rolled Steel Plates, Sheet Piling and Bars for Structural Use”.
- B. Qualifications for Welding Work: Quality welding processes and welding operators in accordance with AWS “Standard Qualification Procedures”.

- C. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. Allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.
- D. Inserts and Anchorages:
 - 1. Furnish inserts and anchoring devices which must be set in concrete or built into masonry for the installation of miscellaneous metal work. Coordinate delivery with other work to avoid delay.
 - 2. See concrete and masonry sections of these specifications for installation of inserts and anchorage devices.
- E. Shop Assembly: Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the project site. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassemble and coordinated installation.

1.3 SUBMITTALS:

- A. General: Comply with requirements of Section 01340, Shop Drawings, Product Data and Samples.
- B. Manufacturer's Data: Manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work including paint products. Indicate by transmittal that copy of instructions has been distributed to the installer where required.
- C. Shop Drawings: Submit shop drawings for the fabrication and erection miscellaneous metal work which are not completely shown by the manufacturer's data sheets.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General: Select materials to meet the standards specified or otherwise indicated.
- B. Cast Iron Pipe Escutcheons: as manufactured by Neenah Foundries, or approved equal, of the size and type as shown on the drawings.

- C. Aluminum plates, shims and trim pieces, per Aluminum Association (AA) and ASTM B221 – Alloy G.S. 10a T6).
- D. Steel Plates to Bent or Cold-Formed ASTM A 283, Grade C.
- E. Steel Bars and Bar-Size Shapes: ASTM A 283, Grade D, or ASTM A 36.

2.2 ANCHORS

- A. Threaded-Type Concrete Inserts (TCI): Galvanized ferrous castings, internally threaded to receive required diameter machine bolts; either malleable iron complying with ASTM A 47 or cast steel complying with ASTM A 27; hot-dip galvanized in compliance with ASTM A 153.
- B. Wedge-Type Concrete Inserts (WCI): Galvanized box-type ferrous castings, designed to accept required diameter bolts having special wedge-shaped heads; either malleable iron complying with ASTM A 47 or cast steel complying with ASTM A 27; hot-dip galvanized in compliance with ASTM A 153.
 - 1. Provide carbon steel bolts having special wedge-shaped heads, nuts, washers and shims; all galvanized in compliance with ASTM A 153.
- C. Slotted-Type Concrete Inserts (SCI): Galvanized 1/8 inch thick pressed steel plate complying with ASTM A 283; box-type welded construction with slot designed to receive 3/4 inch diameter square head bolt and with knockout cover; hot-dip galvanized in compliance with ASTM A 386.
- D. Masonry Anchorage Devices: Expansion Shields: FS FF-S-325.
- E. Toggle Bolts: Tumble-wing type: FS FF-B-588, type, class and style as required.

2.3 FASTENERS:

- A. General: Provide zinc-coated fasteners, with galvanizing complying with ASTM A 153, for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required for the installation of miscellaneous metal items.
- B. Standard Bolts and Nuts: ASTM A 307, Grade A, regular hexagon head.
- C. Lag Bolts: FS FF-B-561, square head type.
- D. Machine Screws: FS FF-S-02, cadmium plated steel.

- E. Wood Screws: FS FF-111, flat head carbon steel.
- F. Plain Washers: FS FF-W-92, round, general assembly grade carbon steel.
- G. Lock Washers: FS FF-W-84, helical spring type carbon steel.

2.4 PAINT:

A. Metal Primer Paint:

1. Red mixed pigment, alkyd varnish, linseed oil paint complying with FS TT-P-86G, Type III; or red lead iron oxide, raw linseed oil, alkyd paint, complying with SSPC Paint 2-64; or basic lead silico chromate base iron oxide, linseed oil, alkyd paint, complying with FS TT-P-615, Type II.
2. Primer paint selected must be compatible with the required finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 9 of these specifications.

B. Galvanized Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, complying with military specifications MT>-P-21035 (Ships).

C. Powder Coating: N/A

D. See also Specification Section 09901: Exterior Painting

2.5 FABRICATION:

- A. Workmanship: Use materials of size and thickness shown, or, if not shown, of required size and thickness to produce adequate strength and durability in the finished product for the intended use. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for the various components of work.
- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent-metal corners without otherwise impairing the work.
- C. Weld corners and seams continuously and in accordance with the recommendations of AWS. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

- D. Form exposed connections with hairline joints which are flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, use Phillips flathead (countersunk) screws or bolts.
- E. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices as shown and as required to provide adequate support for intended use of the work.
- F. Cut, reinforce, drill and tap miscellaneous metal work as may be required to receive finish hardware and similar items of work.
- G. Use hot-rolled steel bars for work fabricated from bar stock, unless work is indicated to be fabricated from cold-finished or cold-rolled stock.
- H. Galvanizing: Provide a zinc coating for those items shown on drawings or specified to be galvanized, using hot-dip process after fabrication.
 - 1. ASTM A 153 for galvanizing of iron and steel hardware.
 - 2. ASTM A 123 for galvanizing of rolled, pressed and forged steel shapes, plates, bars and strip 1/8 inch thick and heavier.
 - 3. ASTM A 386 for galvanizing of assembled steel products.
- I. Shop Paintings:
 - 1. Shop paint miscellaneous metal work, except those members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded and galvanized surfaces, unless otherwise indicated.
 - 2. Remove scale, rust and other deleterious materials before shop coat of paint is applied. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning", or SSPC SP-3 "Power Tool Cleaning", or SP-7 "Brush-Off Blast Cleaning". Remove oil, grease and similar contaminants in accordance with SSPC SP-1 "Solvent Cleaning".
 - 3. Apply one shop coat of metal primer paint to fabricated metal items, except apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.
 - 4. Immediately after surface preparation, brush or spray on metal primer at a rate to provide a uniform dry film thickness of 1.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and all exposed surfaces.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Examine areas and conditions under which miscellaneous metal items are to be installed. Notify Architect in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until satisfactory conditions have been corrected.

3.2 PREPARATION:

- A. Furnish setting drawing, diagrams, templates, instruction and directions for the installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the project site.

3.3 INSTALLATION:

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal items to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, lag bolts, wood screws and other connectors as required.
- B. Cutting, Fitting and Placement:
 - 1. Perform cutting, drilling and fitting required for the installation of miscellaneous metal items. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.
 - 2. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Grind joints smooth and touch-up shop paint coat. Do not weld, cut or abrade surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
- B. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearances and quality of welds made and methods used in correcting welding work.

3.4 FIELD PAINTING:

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections and abraded areas of shop painted items and paint all exposed areas with the same materials used for shop painting. Apply by brush or spray to provide minimum dry film thickness of 2.0 mils.

---END OF SECTION ---

SECTION 06100 ROUGH CARPENTRY

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

The provisions of Division 1 shall apply to the work of this section.

All materials labor equipment and accessories required for the complete installation of all rough carpentry and all other work of this section including but not limited to the following:

- a.. Forming and blocking of every description as required and/or indicated on the drawings.
- b. Rough wood, decking, platforms, temporary enclosures and framing.
- c. All grounds required for finished work.

1.2 RELATED WORK SPECIFIED ELSEWHERE:

Work related to work specified in this section includes but is not limited to the following:

- a. Section 03100 - Concrete Formwork
- b. Section 06200 - Finish Carpentry

1.3 QUALITY ASSURANCE:

A. Code: Except as otherwise shown, all carpentry work is to be performed in accordance with the applicable provisions of the New Mexico Building Code, latest edition.

B. Workmanship: All work shall be done by personnel well qualified in the trade and shall be erected plumb, true and square, joined accurately and fitted to suit requirements of the work.

C. Grading Standards: Dimension lumber shall be graded in accordance with Voluntary Product Standard PSI and the standard grading rules of one of the following agencies:

- 1. West Coast Lumber Inspection Bureau;
- 2. Western Wood Products Association.

1.4 JOB CONDITIONS:

- A. Cooperate with other contractors and provide grounds, stripping, nailing bucks, blocking, and other wood construction as required to properly secure all materials, equipment, etc.
- B. Read specifications complete, and accomplish any work therein specified which will require work by carpenters and is usually considered as such.
- C. Performed work under this section with particular reference to timing and conduct of operations and in cooperating to facilitate work of other trades.

PART 2 - PRODUCTS

2.1 GENERAL:

Provide all materials as shown on drawings and/or as required for the successful execution of the work, whether specifically noted or not. Size as required to provide a minimum of joints.

- A. Plywood: Type, grade, thickness and identification index as shown on the drawings with APA grade-trademark on each piece. Fabricated in accordance with Voluntary Product Standard PS 1-74, "Construction and Industrial Plywood".
- B. Asphalt Impregnated Sheathing: thickness as indicated, "Celotex" or approved equal.
- C. Framing, Joists, Planks, Board Lumber, etc: #1 Douglas Fir-Larch or better, 19% maximum moisture content, S45, grade marked.
- D. Fastening Devices: Bolts, nuts, washers, nails, shields, screws, spikes, etc. as required.
- E. Polyethylene Film: 8 mil thickness.
- F. Metal Connector Plates: gang-nail truss connectors #GN-20, where required, galv., ASTM A-446-7, Grade A.
- G. Wood Framing Connectors: "Strong-Tie" connectors as manufactured by the Simpson Company, model numbers as shown on the drawings.
- H Ply-Clips: Size as required.
- I. Expandable joint filler material: Refer to Section 07920 Sealants & Caulking.

PART 3 - EXECUTION

3.1 TEMPORARY ENCLOSURES:

- A. Provide temporary closures at all openings where so required to protect the work and deny illegal entry.

B. Provide all outside door openings into the buildings with temporary hinged doors complete with hinges, locks and keys. Ensure that all closures are sturdy enough to provide protection against forced entry.

3.2 PROTECTIVE BARRIERS AND COVERS:

A. Provide approved temporary wood railings or barricades.
in accordance with requirements of Section 01500, Temporary Facilities.

B. Provide temporary wood covers for exposed masonry sills or jambs and other openings where construction operations or traffic might damage finished work.

3.3 GROUNDS, NAILERS, CURBS AND SCREEDS:

A. Grounds and nailers: Provide Mill dressed grounds and nailers properly set and secured to rough construction wherever required as base for attachment of equipment, accessories or finish Materials, and wherever grounds are required for proper application of finishes.

B. Curbs and screeds: Provide curbs and screeds under roof mounted equipment as shown on drawings or as required for a complete and proper installation. Run screeds continuous to next joist beyond equipment.

3.4 ANCHOR PLATES:

Unless steel anchor plates are required, provide a minimum of 2 x 12 blocking rigidly secured (bolt and/or screw) between studs or within construction at all locations where cabinets, fixtures; devices, etc. are required to be wall mounted.

3.5 EXPANDABLE JOINT FILLER MATERIAL:

A. Where indicated on drawings, install in joint between top of partitions and underside of deck. Compress as required and place in joint.

3.6 ADJUST AND CLEAN:

A. Thoroughly inspect all installed systems and/or materials.

B. Remove and replace all defective work. Remove all temporary installations to leave no trace. Remove all debris resulting from operations and leave area and surfaces broom clean, ready for other trades.

3.7 GUARANTEE

A. Guarantee the work and materials of this section for a period of one year from the date of substantial completion.

END OF SECTION

SECTION 06200

FINISHED CARPENTRY AND MILLWORK

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

The provisions of Division 1 shall apply to the work of this section.

1.2 WORK INCLUDED

All the materials and labor, equipment and accessories required for the complete installation of all finished carpentry, millwork, and all other work of this section including but not limited to:

- a. Cabinetry and countertops
- b. Interior trim and molding of every description.
- c. Finished hardware installation.
- d. Priming, backpainting, shop painting, etc.
- e. All required ground, blocking, furring, cutting, fitting, patching, as required to accommodate the work of this and other trades.
- f. Temporary protection, enclosures, covers, and rails.

1.3 WORK OF OTHER SECTIONS

- a. Interior gypsum wallboard
- b. Painting except shop priming and field back-priming

1.4 EXAMINATION OF EXISTING WORK AND FIELD MEASUREMENTS

Examine all work prepared by others to receive work of this section and report any defects affecting installation to the General Contractor for correction.

Commencement of work will be construed as complete acceptance of preparatory work by others. Take accurate field measurements for all items of work.

1.5 GENERAL

- a. Time delivery and installation of carpentry work to avoid delaying other trades whose work is dependent on or affected by cx work, and to comply with protection and storage work.
- b. Installer must examine all parts of supporting structure and the conditions under which the carpentry work is to be installed, and notify the

Contractor in writing of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the installation until satisfactory conditions have been corrected in a manner acceptable to the installer.

- c. Keep carpentry materials dry during delivery. Store lumber and plywood in stacks. Protect bottom of stacks against contact with damp or wet surfaces. Protect exposed materials against weather.
- d. Do not store treated or dressed lumber or plywood outdoors.
- e. Store materials for which a maximum moisture content is specified, only in areas where relative humidity has been reduced to a level where specified moisture content can be maintained with a tolerance of plus or minus 1%.
- f. Optimum moisture Content: Kiln-dry wood to an average moisture content within the following ranges, as recommended by AWI section 100 G-3 for regional climactic conditions involved:
Exterior Woodwork: 9% to 12%
Interior Woodwork: 6% to 11%

PART 2 - PRODUCTS

2.1 MATERIALS

- a. Interior Plywood: See Section 5B
- b. Woodwork for Paint Finish: Except as otherwise specified, comply with the following:
 - i. Grade: AWI, Section 300, Custom Grade.
 - ii. Species of Wood: Any close grain softwood, except flat grain Douglas Fir, Yellow Pine, flat grain redwood, or Sitka Spruce, or any closed grain hardwood species.
- c. Wood for Support or Attachment of other work such as cant strips, bucks, nailers, blocking, furring, grounds, stripping, and similar members: No. 2 Common Grade of any WWPA of SCLA species or No. 2 Southern Pine Boards (SPIB).

2.2 MISCELLANEOUS ACCESSORIES

- a. Anchorage and Fastening Materials: Select proper type, size, material and finish for each application.
- b. Provide stainless steel or aluminum nails for exposed exterior surfaces which are to receive transparent finish, such as exterior siding, trim, fascias, etc. Do not use galvanized nails.

PART 3 - EXECUTION

3.1 INSTALLATION

- a. General: Use only wood thoroughly seasoned, well-manufactured material of the longest practical lengths and size to minimize jointing. Use material free from warp which cannot be easily corrected by anchoring and attachment. Sort out and discard warped material and material with other defects that would impair the quality of the work.
- b. Fabricate woodwork to dimensions, profiles and details shown. Rout or groove back of flat trim members.
- c. Miter joints, where shown or where required by AWI standards to be shop mitered, by joining, splining, and gluing to comply with the requirements of Section 300-5 for the specified grade.
- d. Job Assembled Items: Distribute defects allowed in specified grades to best overall advantages.
- e. Attach woodwork securely in place with uniform joints providing for thermal and building movements.
 - i. Nailing: Blind nails where possible. Use fine finishing nails where exposed. Set exposed nail heads for filling with wood putty, except for exterior wood which is to receive a natural finish (if any).
 - ii. Anchoring: Secure woodwork to anchors or blocking built-in or directly attached to substrates.
- f. Wood Grounds, Nailers, Blocking, and Sleepers: Provide wherever shown and where required for securing or attachment of other work. Form to shapes as shown and cut as required for true line and level or work to be attached.

3.2 EXTERIOR TRIM

- a. Miter standing trim at corners.
- b. Cope running at internal corners and mitered at external corners. Return exposed ends of molds to match face of profiles.
- c. Splice with butt joints over solid bearing and nail securely. Splices not permitted in sections less than 8' long.
- d. Set exposed nail heads to receive putty or filler. Sand trim to eliminate marks and defects that could affect finish.

3.3 PREPARATION FOR PAINTER'S FINISH

Clean, smoothly dress, and sandpaper all exposed surfaces. No plane or tool marks shall show. Further dress all exposed surfaces or interior finish woodwork with fine grit sandpaper or steel wool, to smooth and clean surfaces. Deeply set nails and screws at interior and exterior wood trim to receive wood putty under another section.

3.4 TEMPORARY PROTECTION

- a. Temporary wood entrance doors shall be provided in all doorway openings in exterior walls. These doors shall be substantially built and hung, equipped with proper hinges, locks and other necessary hardware and shall be removed and rehung whenever required to accommodate the work of the trades requiring their removal. Doors shall be kept in good repair at all times.
- b. Provide proper temporary wood coverings at all openings in floors, roofs, duct shafts, stair wells, etc., using planking 2" thick cleated together. Provide and install substantial wood railing around all openings in floors and roofs until such openings have been permanently sealed.
- c. All specified temporary protection such as wood doors, protection of stairs and over and around roof and floor openings, etc., shall be maintained in good order and repair during the contract period.
- d. All temporary protection shall comply with the requirements of the local Building Department and O.S.H.A.

3.5 GUARANTEE

The Contractor shall guarantee all work of this section for a period of one year from the date of final acceptance in accordance with the general conditions.

END OF SECTION

SECTION 07210

BUILDING INSULATION

1 PART 1 – GENERAL

- 1.1 **WORK INCLUDED:** Insulation required for this Work includes wall cavity insulation, foundation rigid insulation, under slab rigid, all to be installed during construction.
- 1.2 **SUBMITTALS:**
- A. General: Make all submittals and resubmittals in strict accordance with the provisions of these specifications.
 - B. Product Data: Submit literature showing that proposed materials meet the requirements of this section.
 - C. Manufacturer's Recommendations: Accompanying that product data submit two copies of the manufacturer's current recommended method of installation for all insulation materials and project conditions.
- 1.3 **PROTECTION:**
- A. Deliver materials to the job site and store in a safe dry place with all labels intact and legible at time of installation.
 - B. Use all means necessary to protect insulation materials before, during, and after installation and to protect the installed work and materials of other trades.
 - A. REPLACEMENTS: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.4 PART 2 – PRODUCTS

- 1.1 **ACOUSTICAL WALL INSULATION:**
R-20 insulation shall consist of two layers of 3" thick, R-10, UL 25/50 rated, fiberglass acoustic sound attenuating blankets or approved equal blown in insulation.

RIGID FOUNDATION, SLAB AND EXTERIOR INSULATION

1. Description: insulation consisting of closed cell polyisocyanurate foam core and glass reinforced mat laminated to the face. Nominal Size is 48"x 48" for adhesive application or 48"x 96" for mechanically attached application.
 - a. Reference Standards:
 - (1). FS HH-I-1980/Gen.
 - (2). FS HH-I-1973/3.
 - (3). ASTM C 209 - Water Absorption.
 - (4). ASTM E 96-Water Vapor Transmission of
- Materials.
 - (5). ASTM D 1621 - Compressive Strength.
 - (6). ASTM D 1622 – Density.
 - (7). ASTM D 2126 - Dimensional Stability.
 - (8). ASTM E 84 - Flame Spread.
2. Provide a minimum of two layers of insulation. Minimum of 20-psi compressive strength, square edge

INSULATION ATTACHMENT

1. Mechanical Fasteners:
 - a. Attach insulation using Fasteners and Insulation Plates in accordance with the manufacturer's Induction Welded assembly to comply with the wind uplift design based on FM 1-75 as detailed in the specifications above. In a multi-layer insulation assembly, the type and thickness of the top layer of insulation determine fastening pattern. Insulation fasteners shall penetrate the top of the flutes and shall be sufficient to penetrate deck a minimum of ¾" for steel and 1" for wood and concrete. Structural concrete decks must be pre-drilled with a 7/32" carbide drill bit to a depth ½" deeper than the fastener engagement. Roofing contractor is liable for replacing fasteners that extend beyond the bottom of the flutes.
 - b. Reference Standard: SAE 1022, Heat Treated.
 - c. Product/Producer: Heavy Duty (HD) fasteners.
 - d. Provide fasteners sufficient to produce FM I-75 uplift resistance attachment patterns to the deck.
- 1.2 OTHER MATERIALS: All other materials, such as fasteners and retainers, not specifically described, but required for a complete and proper installation of building insulation, shall be subject to the approval of the Architect.

PART 3 – EXECUTION:

1.1 INSPECTION:

- A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that building insulation may be installed in accordance with the original design and the manufacturer's recommendations.

1.2 DISCREPANCIES:

- A. In the event of discrepancy, immediately notify the Architect.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

1.3 INSTALLATION:

- A. General:
Except as otherwise specifically directed by these specifications, install of insulation in accordance with the current published standards of the Manufacturer.

- 1.4 INSPECTION: Upon completion of the installation, visually inspect each insulated area and verify that all insulation is complete and properly installed. Replace any faced insulation where the facing has been damaged or punctured.

-----END OF SECTION-----

SECTION 07500
HEAT INDUCTED WELDED 80 MIL PVC ROOFING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SCOPE OF WORK

- A. Furnish and install an 80 mil, white polyester scrim reinforced, PVC (polyvinyl chloride) sheet roofing membrane system. Membrane shall be a high molecular weight. Installed system shall include; insulation, flashing, sealants and all accessories and labor necessary for a complete insulated sheet roofing assembly.
- B. Furnish and install this membrane roofing system in strict accordance with Drawings and Specifications approved by Roof Systems Manufacturer. If conflicts in application arise, material will be installed in accordance with the manufacturer's strictest recommendations.
- C. Related Sections:
 - 1. Section 07620 – Sheet Metal Flashing and Trim
 - 2. Section 07920 – Sealants & Caulking

1.3 REFERENCES

- A. IBC-International Building Code-Roofing Related Sections
- B. ASTM – American Society for Testing and Materials.
- C. Factory Mutual (FM) Engineering Corporation - Roof Assembly Classifications.
- D. ASCE-7- American Society of Civil Engineers-Wind Load Pressure Calculation Procedures
- E. NRCA – National Roofing Contractors Association.
- F. SMACNA – Sheet Metal and Air Conditioners National Association.
- G. Underwriters Laboratories (UL) - Fire Hazard Classifications.
- H. FS – Federal Standard
- I. ANSI / SPRI ES-1 - (see also, 2009 IBC Section 1504.5)

1.4 BIDDER'S REPRESENTATION

Section 07500 - SINGLE PLY PVC ROOFING

- A. A large part of the value of this work is contained in the bidder's and the bidder's proposed manufacturer's capacity to provide long-term responsibility for the satisfactory performance of the roof. A 20-year, no dollar limit warranty for the benefit of the Owner is required. To that end, the following requirements are essential provisions of this specification:
1. By offering a bid for this work, the bidder certifies that he has visited the site and determined that all the conditions of the surrounding and underlying work are consistent with his proposed manufacturer's requirements for the specified warranty. In the event that the bidder discovers any condition of the surrounding and underlying work that would prevent him or his manufacturer from providing the specified warranty, he shall report it to the design professional not less than ten days prior to the bid opening.
 2. By offering a bid for this work, the bidder certifies that he has examined the Contract Documents, can meet all imposed time completion requirements and has found all the details and requirements of the scope of work are complete and consistent with his proposed manufacturer's requirements for the specified warranty. In the event that the bidder discovers any detail or requirement in the Contract Documents that would prevent him or his manufacturer from providing the specified warranty, he shall report it to the design professional not less than ten days prior to the bid opening.
 3. By offering a bid for this work, the bidder certifies that he can, within ten calendar days of a notice of award from the Insurer, provide a surety bond for the performance of the work, a surety bond for payment of labor and materials, and a specimen warranty certificate from the manufacturer whose system that is proposed to be used on the project.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications

1. The manufacturer of the roofing system shall be the actual manufacturer of the roofing materials. The insulation and the component materials can be made by others, all testing requirements and implied warranties must be verifiable and labeled under the roofing manufacturer's name. All manufacturers and sub-manufacturers shall have not less than fifteen (15) years experience in the production of thermoplastic membrane roof systems and their components. Manufacturer must provide approved uplift testing for induction welded roof systems.
2. The manufacturer shall certify the scrim reinforced PVC membrane meets the physical properties specified.
3. The contractor shall include a certification from the manufacturer, on the manufacturer's letterhead, that the proposed membrane, insulation and accessories will be covered in the warranty by the manufacturer of record.

B. Installer Qualifications

1. Applicator: A company approved by Manufacturer, and specializing in single-ply roofing systems with at least twenty (20) installations of thermoplastic, scrim reinforced membrane, five (5) of which are Heat Induced Welded installations.

The crew shall be composed of experienced installers skilled in this roof assembly. The contractor shall provide a superintendent /foreman on site full time that is aware of all project aspects and authorized to make on site decisions as required. The contractor will be required to properly staff the project at all times.

C. Inspections

- 1.Manufacturer's Technical Representative: The manufacturer of the roofing system shall be required to attend the roof pre-installation conference to accept the conditions of the work and to perform interim inspections during installation. After the roof installation is complete, the manufacturer's technical representative, unrelated to the sales department of the manufacturer, shall inspect the work and inform (by written report) the design professional, contractor, Insurer/Insurer's consultant and the installer of defective/incomplete work to be remedied. Those areas indicated shall be corrected to the full satisfaction of the design professional, Insurer, and manufacturer. Copies of all inspection reports from the manufacturer shall be promptly submitted to the design professional and the roofing consultant. The manufacturer shall submit written acceptance of the project to the design professional in issuance of the weather-tightness warranty and that the system has been installed according to the Manufacturer's published specifications and details. Report describing inspections, corrective actions and certifying manufacturer's acceptance of installation shall be submitted to the Architect in accordance with Section 01400 - Quality Requirements.
- 2.Roofing Consultant: The Insurer reserves the right to retain, at the Insurer's expense, an independent consultant service to review construction documents and provide full-time inspection of the roofing system installation. The inspector shall have free access to inspect and test all items related to the project and the work area. The consultant/inspector will be responsible for accepting the installed roofing on behalf of the Insurer. The roofing contractor/general contractor will keep the consultant informed of all schedules, delays and inspections of the manufacturer (2 week notice)

D. Work shall conform to:

- 1.NRCA Roofing and Waterproofing Manual, Latest Editions.
- 2.SMACNA Architectural Sheet Metal Manual, 2003 Edition.
- 3.Underwriters Laboratories, Inc. (UL): Class A Fire Hazard Classification.
- 4.IBC International Building Code: related current code requirements.
- 5.ASCE-7- American Society of Civil Engineers-Wind Load Pressure Calculation Procedures and requirements.
- 6.Factory Mutual Engineering Corporation (FM): Roof assembly classification with a minimum of a wind uplift fastening pattern based of FM 1-75. Construction Bulletin 1-28, latest Edition to include perimeter and corner enhancements:
Field = 37.5 psf; Perimeter = 60 psf; Corner = 90 psf.

1.6 SUBMITTALS

A.Provide in accordance with Conditions of Contract and Division 1 Specification Sections.

Section 07500 - SINGLE PLY PVC ROOFING

1. Shop Drawings: Submit shop drawings indicating;
 - a. Roof size, location, and type of penetrations as required for the following.
 - b. Roof assembly composition and attachment to deck.
 - c. Insulation assembly and cricket layout plan with cross sections and slope of tapered insulation.
 - d. Insulation fastening patterns that are required to conform to wind uplift design based on FM 1-75 insulation fastening requirements at the field, including enhancements at perimeter and corners.
 - e. Roof perimeter and corner areas as defined by FM Loss Prevention Data Sheet 1-28 with the width dimensioned for each roof section.
 - f. Complete set of details for all perimeters, drains, penetration and roof accessories flashings and terminations and manufacturer's published installation procedure details. All termination details must conform to project specifications and detail drawings provided.
 - g. All roof related sheet metal items submitted in conformance with the submittal requirements of Sheet Metal Flashing & Trim specification section, as well as SMACNA approved designs. Flashings at roof perimeters shall be certified ANSI / SPRI ES-1 details. (see also, 2006 IBC Section 1504.5).
2. Product Data Submittals:
 - a. Provide technical product data sheets on ALL materials and accessories that are to be used in the roof assembly and associated with the roof including UL product listing and FM System listing for each type of insulation. The data sheets should be clearly marked where choices occur for type and thicknesses.
 - b. The Insulation manufacturer shall certify a warranty to the membrane manufacturer in order to meet the complete system warranty.
 - c. For fasteners that are to penetrate into, or through, pressure preservative treated lumber use stainless steel, hot dipped galvanized coated or provide certification from manufacturer that coating is compatible with preservative used for wood treatment.
3. Fire Resistance: Provide roofing system, insulation, and component materials that have been tested for application and slopes indicated and are listed by UL for Class A external fire exposure over decks specified herein. Provide confirmation in submittal package.
4. Wind Uplift: Provide rigid insulation, roofing system, and component materials as specified and that have been tested as a complete system for application for the structural deck and slopes for this project. The system needs to be listed in Factory Mutual Research Approval Guide. Provide attachment to the deck that meets FM 1-75 membrane/insulation fastening requirements. Submit data that confirms this requirement.
5. Copy of certificate documenting manufacturer's approval of installer as required in Paragraph 1.4-B-1.
6. Copies of test reports showing compliance with requirements as specified in Paragraph 2.02.
7. Samples:

- a. 12 inch square minimum sample of roofing membrane including lap seam
 - b. Sample RhinoBond Plate and fastener provided by the membrane manufacturer.
8. Provide copy of manufacturers' printed installation instructions and current recommendations.
9. Provide certification that Manufacture has accepted the proposed roof assembly and that the assembly will be eligible for their 20 year total system N.D.L. warranty.
10. Provide copy of warranties required in Paragraph 1.6 for review and approval by design professional. Warranty shall include a minimum wind speed warranty of 80mph.
11. Provide proposed Over Night seal proposed including product data sheets for each product.

1.7 WARRANTY

- A. Manufacturer's Warranty: Provide roofing manufacturer's total system leak-tight 20-year labor and 20-year material "No Dollar Limit Warranty," including insulation and all components. The warranty shall contain no exclusion or limitation for improper installation, damage from water that ponds, or does not drain freely. Provide all details necessary to qualify for manufacturer's "No Dollar Limit Warranty" and the manufacturer will respond within 48 hours and repair, within five (5) business days, any leaks in the roofing assembly for the warranty period stated above at no cost to the owner, unless the leak is determined to be caused by others. The warranty shall cover wind speeds up to and including 80 mph.
- B. Roofer's Guarantee: Provide written guarantee from the Contractor stating that the Contractor will respond within 24 hours and repair within five (5) business days, any leaks in the roofing assembly for 2 years at no cost to the owner.
- C. Additive Alternate: Pricing shall be provided for a 30- year material "No Dollar Limit Warranty," including insulation and all components. The warranty shall contain no exclusion or limitation for improper installation, damage from water that ponds, or does not drain freely. Provide all details necessary to qualify for manufacturer's "No Dollar Limit Warranty" and the manufacturer will respond within 48 hours and repair, within five (5) business days, any leaks in the roofing assembly for the warranty period stated above at no cost to the owner, unless the leak is determined to be caused by others. The warranty shall cover wind speeds up to and including 80 mph.

1.8 PRE INSTALLATION CONFERENCE

- A. Conduct a pre-installation conference prior to commencing work of this section at project site under provisions in Division 1 Section "Project Management and Coordination". Review methods and procedures related to roofing system including, but not limited to, the following:
 1. Meet with Owner, Architect, Insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or

- affects roofing including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system or whose work will interface with the roof assembly as part of the building envelope.
 7. Review governing regulations and school safety requirements.
 7. Review temporary protection requirements for roofing system during and after installation.

1.9 DELIVERY, STORAGE, HANDLING

- A. Deliver products to site in unopened containers showing brand names and instructions.
- A. Store and protect temperature sensitive products in 55° to 80°F environment prior to usage. Store flammable or toxic material according to label instruction. Store each product in weather-protected environment, clear of ground and moisture.
- B. Protect insulation from direct exposure to sunlight and moisture. For polyisocyanurate insulation, follow the recommendations of PIMA and the manufacturers requirements.
- C. Mark wet, damaged & defective materials and remove from site the same day

1.10 JOB SITE CONSIDERATIONS (CAUTIONS AND WARNINGS)

- A. Keep all adhesives, sealants and cleaning materials away from ALL ignition sources (i.e., torches, flames, fire, sparks, etc.).
- B. Consult container labels and Material Safety Data Sheets for specific safety instructions for all products used on the project.
- C. All bonding, splicing, and sealing surfaces must be free of dirt, moisture, and any other contaminants.
- D. When the outside temperature is below 40°F (4.44°C), certain combinations of temperature and humidity may cause condensation on the surface of the membrane Bonding Adhesive. If this condition occurs, do not mate the surfaces. When the ambient air-conditions no longer cause condensation, apply additional Bonding Adhesive and proceed.

- E. If Bonding Adhesive is used, temperature must be 40°F (4.44°C) and rising for the material to perform as designed.
- F. Do not use open flame sources (i.e., propane torches, etc.) to expedite drying of adhesives, sealants, etc. Allow to air dry only.
- G. Do not thin or modify any materials.
- H. Deliver materials to job site in their original containers as labeled by the manufacturer.
- I. Follow directions for protection of materials prior to and during installation. Do not use materials that have been damaged to the point that they will not perform as specified.
- J. Care should be used when installing fasteners to avoid possible conduits and other piping in and under the deck.
- K. Fumes from adhesive solvents may be drawn into the building during installation, through rooftop intakes. Refer to the Technical Information Sheet "Recommended Guidelines for Application of Roofing Materials to an Occupied Building" in the manufactures manual for specific guidelines.
- L. Store the membrane in the original undisturbed plastic wrap in a cool shaded area and cover with light-colored, breathable tarpaulins, in a manner to protect it from damage. Membrane that has been exposed to the elements for approximately 12 hours or more must be prepared with (Splice Wash) prior to hot air welding.
- M. PVC is a reflective membrane. Adequate UV eye protection is necessary during installation.
- N. Do not use oil base or bituminous base roof cement with PVC Membrane.
- O. Contact Manufactures Technical Services for procedures when installing the membrane during temperatures less than 40°F (4.44°C).

PART 2 - PRODUCTS

2.1 GENERAL

- A. Roof System shall be a UL Class A rated system and attached to the deck in accordance with wind uplift designs based on FM I-75 fastening requirements including corner and perimeter enhancements for induction welded systems.

2.2 MEMBRANE

- A. Induction Welded, 80 mil, polyester scrim reinforced PVC membrane.
- B. Approved Manufacturers:

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Carlisle Sure Flex KEE HP is the basis of Design

1. Flex MF 80 Plus Elvaloy
 3. Fibertite Xtreme 90 mil
- C. Requests for approval shall be submitted a minimum of 10 days prior to bid, in order to give the Owner Adequate time to review the proposal. The request shall be a complete package as noted below. Requirements to obtain consideration for approval of product include: (submit on Manufacturers letterhead)
1. Complete specification with details for Architects review, along with certification from Manufacturer of substitute membrane that proposed material and system is in compliance with all other requirements of this specification.
 2. Proof of experience as a manufacturer of the proposed membrane, with a minimum of five (15) years experience with thermoplastic membrane.
 3. Provide manufacturer certification that membrane contains no liquid plasticizers, and must be high molecular weight PVC polymers.
 4. Provide manufacturers listing of common chemicals that may affect the membrane or the roof system in general.
 5. Verification of UL Class A and FM system rating with a membrane attachment and maximum sheet width, in order to minimize seams on the roof. Every roll of membrane shall be UL labeled.
 6. Provide adequate background information to the owner, to demonstrate that manufacturer has the capability to service, and back the Warranty for the term herein specified.

2.3 ROOF MEMBRANE

- A. Membrane Sheet Material: Membrane shall be 80-mil nominal thickness, KEE HP, white (or tan as noted on drawings) PVC membrane polyester reinforced. There shall be a minimum of 20 mils of PVC membrane above the scrim and the weathering surface of the roof. The PVC sheet physical properties must be actual tested properties of the sheet, not typical or hypothetical values. Membrane must meet or exceed the physical properties of ASTM D-3045 and ASTM G 155 for PVC roofing membranes.

2.4 RELATED MATERIALS

- A. Flashing: Same membrane as Roofing (60 mil reinforced). For field fabricated vent stacks, pipes and corners provide unreinforced 55mil uncured white PVC.
- B. Bonding Adhesive: Standard bonding adhesive provided by Manufacturer to hold flashings in place. Do not apply in seam areas.
- C. PVC Coated Metal: as detailed in the plans, otherwise use specified colored finished metal as detailed.
- D. Sealant: Provide to serve as water cut-off mastic, pitch-box sealer, and to caulk Ethylene Propylene membrane edge to metal. Provide cut edge sealant where required.

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- E. Primer: For preparing contaminated membrane for hot air welding.
- F. Seam Caulk: Shall be provided for the purpose of sealing any non-encapsulated edge of reinforced membrane.
- G. Overnight Seal: As provided by Manufacturer. All seals must be maintained every night.
- H. Sealants: Sealants not a part of the Roofing System shall be compatible with Ethylene Propylene materials and applied according to manufacturer's instructions. Acceptable sealants are one part polysulfide and one part urethane.
- I. Mechanical Fasteners: Manufacturer provided fasteners designed for use on Project roof deck based on requirements of induction welded PVC membrane assemblies. Where installation incorporates insulation within the system, provide fasteners with anti-blackout devices as required by each manufacturer. Mechanical fasteners at exposed deck locations must penetrate the top deck flute and not extend more than 3/4" below the bottom of the deck flutes.
- J. Polyurethane Insulation Foam Adhesive: One part or two part, as recommended by the Manufacturer to adhere insulation in place and applied to meet wind uplift requirements.
- K. Foam Backer Rod: Provide acceptable foam backer rod materials for expansion joints or other building envelope interfaces.
- L. Nailers: No. 2 or better, pressure preservative treated lumber using specified preservatives.
- M. Seam Cleaner: Use a surface cleaner at dirty or contaminated membrane prior to heat weld.
- N. Termination Bar: As provided by manufacturer fastened 6" O.C.
- O. Pipe Boots & Corners: Provide 0.055 inches unsupported PVC flashing at 1" to 6" diameter pipes and at inside and outside corners.
- P. Edge Metal Systems: As specified in Section 07 62 00 – Sheet Metal Flashing and Trim and/or as detailed in plans.
- Q. Counterflashings: As specified in Section 07 62 00 – Sheet Metal Flashing and Trim and/or as detailed in plans. Regardless of manufacturer's requirements, two piece counterflashings shall be installed where detailed on drawings or details.
- R. Where plastic drain strainers exist replace with new cast Iron baskets
- S. Clean drains and pipes to insure that blockage doesn't exist.
- T. Walk Pad: Provide heavy embossed tread pad by PVC manufacturer. Recycled products will be provided where possible.

- U. T-Joints shall be installed on T- Joints.

2.5 ROOF INSULATION PRODUCTS

A. INSULATION

1. Description: Roof insulation consisting of closed cell polyisocyanurate foam core and glass reinforced mat laminated to the face. Nominal Size is 48"x 48" for adhesive application or 48"x 96" for mechanically attached application.
 - a. Reference Standards:
 - (1). FS HH-I-1980/Gen.
 - (2). FS HH-I-1973/3.
 - (3). ASTM C 209 - Water Absorption.
 - (4). ASTM E 96-Water Vapor Transmission of Materials.
 - (5). ASTM D 1621 - Compressive Strength.
 - (6). ASTM D 1622 – Density.
 - (7). ASTM D 2126 - Dimensional Stability.
 - (8). ASTM E 84 - Flame Spread.
2. Provide a minimum of two layers of insulation. Minimum of 20-psi compressive strength, square edge

B COVERBOARD

1. Cover board shall be either of the following as approved by membrane manufacturer for total system warranty, induction weld criteria and roof system code requirements, see drawings.
 - a. 1/2" DensDeck Prime/SecureRock, or equal

C INSULATION ATTACHMENT

1. Mechanical Fasteners:
 - a. Attach insulation using Fasteners and Insulation Plates in accordance with the manufacturer's Induction Welded assembly to comply with the wind uplift design based on FM 1-75 as detailed in the specifications above. In a multi-layer insulation assembly, the type and thickness of the top layer of insulation determine fastening pattern. Insulation fasteners shall penetrate the top of the flutes and shall be sufficient to penetrate deck a minimum of 3/4" for steel and 1" for wood and concrete. Structural concrete decks must be pre-drilled with a 7/32" carbide drill bit to a depth 1/2" deeper than the fastener engagement. Roofing contractor is liable for replacing fasteners that extend beyond the bottom of the flutes.
 - b. Reference Standard: SAE 1022, Heat Treated.
 - c. Product/Producer: Heavy Duty (HD) fasteners.
 - d. Provide fasteners sufficient to produce FM I-75 uplift resistance attachment patterns to the deck.

D. JOB REQUIREMENTS

1. Flat roof areas
 - a. Polyisocyanurate Flat Insulation: R=38, 2 layers minimum, cured value. See

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- drawings for specific areas.
- b. Polyisocyanurate Tapered Insulation: Installed tapered insulation must provide a ¼" per foot slope.
 - c. Polyisocyanurate Crickets: Installed must provide at least a ¼" per foot reverse slope greater than the slope of the field. Install ½" to 0" taper edge board along cricket and field connection. Crickets drawn on drawings are shown for intent only. All crickets should be installed at a minimum 3 to 1 length to width ratio and increased as necessary to provide positive drainage.
 - d. Install ½" specified coverboard as top layer over the insulation and cricket layers.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

- A. Install membrane and accessories in accordance with plans, specifications and manufacturer's specifications and current recommendations following the most stringent requirement of the three.
- B. Do not expose the building and materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during the same day
- C. Protect building surfaces against damage from roofing work.

3.02 DECK EXAMINATION AND PREPARATION

- A. Inspect roof decks for deficiencies and report to the Design Professional immediately any deficiencies. Do not proceed with installation of roof, until all deficiencies have been corrected. Start of roofing shall constitute acceptance of deck.
 - 1. Verify that deck is supported, secured and free of depressions.
 - 2. Verify that metal deck surfaces are dry and free of snow or ice.
 - 3. Verify that roof openings, curbs, pipes, sleeves, ducts & vents through roof are solidly set and wood nailers are in place
 - 4. On roofs to be recovered, remove and replace any wet roofing and insulation, and remove base flashings, penetration flashings, gravel surfacing, blisters and ridges.
 - 5. On roofs to be replaced, remove all roofing to the deck. Clean deck of all debris and power broom clean off all loose granules.

3.03 PHASED CONSTRUCTION & COMPLETION REQUIREMENTS

- A. Phased construction will not be permitted on this project.
- B. Once roofing operations are started, the roofing application, including all associated metal work, must be continuous and finalized with all punch lists completed in the number of work days calculated as follows:
 - 1. 1,000 SF/Day Completion Rate based on a 5 day 40 hour work week, or
 - 2. 1,250 SF/Day Completion Rate based on a 4 day 40 hour workweek.

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The contractor will be responsible for additional fees for additional inspection time resulting from the contractor not completing the roofing installation in the allotted time period. The additional inspection fee is \$700.00 per day.

3.04 WOOD NAILER LOCATION AND INSTALLATION

- A. Install wood nailers at roof edges, metal flashings, gutters, and elsewhere as shown on Drawings and approved shop drawings or as required by system manufacturer. Install wood nailers as follows:
1. Position Wood Nailer: Wood nailers should be installed with a 1/8" gap between each length and each change of direction.
 2. Nailer Height: The Nailer height must match the total thickness of insulation. Where tapered insulation is used, the wood Nailer must be tapered so that it will always be flush at the point of contact with the insulation (refer to Details).
 3. Secure Wood Nailer: Fasten to structural roof and wall framing or deck with fastener heads countersunk with the surface of the Nailer. Mechanically fasten wood nailers to resist 200 pounds force per linear foot of Nailer in any direction. Nailers must be firmly fastened to the deck at 18 inches o.c.
 4. Chemical Treating of Wood Nailer: Chemical treating for fire resistance or other purposes (other than pressure treating for rot resistance) may affect the performance of the PVC Membrane and accessories. Consult Manufacturer's Technical Services Department regarding compatibility.
 5. Treated Wood Fasteners: All fasteners used in wood that has been pressure treated with preservatives must be hot dipped galvanized coated, stainless steel or approved in writing by the fastener manufacturer for use in treated wood.

3.05 INSULATION INSTALLATION

- A. Install Insulation: Install only as much insulation as can be covered with roofing membrane and completed before the end of the day's work or before the onset of inclement weather.
- B. Fit Insulation: Neatly fit insulation to all penetrations, projections, and nailers. Insulation should be loosely fitted, with gaps greater than 1/4" being filled with acceptable insulation. Under no circumstances should the membrane be left unsupported over a space greater than 1/4". Tapered or feathered insulation should be installed around roof drains so as to provide proper slope for drainage.
- C. Crickets: Crickets on plans are shown for intent only. The contractor is responsible for installing the crickets with a sufficient length to width ratio to provide positive drainage to drains/scuppers. If the crickets are overlaid with a layer of insulation, a row of fasteners should be applied along the cricket valley line to insure the overlay conforms to the cricket configuration. If the crickets are installed on top of all insulation, a tapered edge strip sized from the cricket edge height down to 0" shall be installed.

- D. Insulation Attachment To Deck:
1. Mechanical Attachment: Attach insulation using Fasteners and Insulation Plates in accordance with the manufacturer's Induction Welded assembly to comply with the wind uplift design based on FM 1-75 as detailed in the specifications above. In a multi-layer insulation assembly, the type and thickness of the top layer of insulation determine fastening pattern. Insulation fasteners shall penetrate the top of the flutes and shall not extend into the building interior. Fastener length shall be sufficient to penetrate deck a minimum of $\frac{3}{4}$ " for steel and 1" for wood and concrete. Structural concrete decks must be pre-drilled with a $\frac{7}{32}$ " carbide drill bit to a depth $\frac{1}{2}$ " deeper than the fastener engagement. Roofing contractor is liable for replacing fasteners that extend beyond the bottom of the flutes. Mechanical fasteners at exposed metal deck locations must not extend more than 1" below the bottom of the deck flutes.
- E. Stagger Insulation Joints: All joints are to be staggered. When installing multiple layers of insulation, all joints between layers should be staggered.

3.06 MEMBRANE INSTALLATION

- A. Starting at the low point of the roof, place the membrane panels without stretching over the acceptable substrate. Position subsequent membrane sheets in the same manner, overlapping the ends of adjoining sheets a minimum of 3" and side laps a minimum of 6". Install panels to insure that laps shed water.
- B. Where PVC Membrane has been cut to expose reinforcing membrane, PVC Cut Edge Sealant or must be used to encapsulate exposed edge.
- C. Weld membrane to Rhino fasteners using induction-welding tools as recommended by manufacturer, following specified pattern provided by manufacturer
- D. Follow manufacturers direction for verification of induction welding procedure of plate bonded attachment of membrane.
- E. For corners and perimeters follow enhancement patterns as specified for FM 1-75 uplift design requirements.

3.07 MEMBRANE LAP SPLICING

- A. Lap splice areas that have been contaminated must be wiped down with a dry or damp (water only) clean cloth prior to heat welding and allow to completely dry.
- B. All field and flashing splices on the horizontal surface shall be completed using an automatic heat welder that has been designed for hot air welding of PVC membranes.
- C. Hand held welders are only to be used on vertical welds or where an automatic welder is not practical or cannot be used.
- D. Seams made with the automatic welder shall be a minimum of 1-1/2" wide. Seams made with hand welders shall be a minimum of 2" wide. Use 2" side silicone or

silicone coated steel hand rollers to assure proper mating of surfaces as hand heat welding proceeds.

- E. Probe all completed welds using a slotted screwdriver or cotter pin puller type tool to verify seam integrity. Do not probe welds until they have had time to cool to ambient conditions. Any welds found to be insufficiently welded need to be repaired on a daily basis.

3.08 MEMBRANE SECUREMENT

A. Mechanical Fasteners:

- 1. Attach insulation using Fasteners and Insulation Plates in accordance with the manufacturer's Induction Welded assembly to comply with the wind uplift design based on FM 1-75 as detailed in the specifications above. In a multi-layer insulation assembly, the type and thickness of the top layer of insulation determine fastening pattern. Insulation fasteners shall penetrate the top of the flutes and shall be sufficient to penetrate deck a minimum of $\frac{3}{4}$ " for steel and 1" for wood and concrete. Structural concrete decks must be pre-drilled with a $\frac{7}{32}$ " carbide drill bit to a depth $\frac{1}{2}$ " deeper than the fastener engagement. Roofing contractor is liable for replacing fasteners that extend beyond the bottom of the flutes.

- B. Secure field membrane with term bar up on all walls, curbs, penetrations 2' or greater and apply term bar sealant to provide compression seal.

3.09 FLASHING - PENETRATIONS

A. General:

- 1. Flash all penetrations passing through the membrane.
- 2. The flashing seal must be made directly to the penetration.

B. Pipes, Round Supports, etc.

- 1. Flash with Pre-Molded PVC Pipe Flashings where practical
- 2. Flash using PVC unsupported flashing membrane when Pre-Molded Flashing is not practical.

C. Roof Drains

- 1. Provide a clean even finish on the mating surfaces between the clamping ring and the drain bowl.
- 2. Taper insulation around the drain to provide a smooth transition from the roof surface to the drain.
- 3. Place sealant on top of drain bowl where the clamping ring seats below membrane.
- 4. Install the roof drain clamping ring and clamping bolts. Tighten the clamping bolts to achieve constant compression.

D. Pipe Clusters and Unusual Shaped Penetrations

- 1. Fabricate penetration pockets to allow a minimum clearance of 1" between the penetration and all sides.
- 2. Secure penetration pockets per Manufacturers recommendations.

3. Fill penetration pockets with Pourable Sealer, so as to shed water.
 - E. Flexible Penetrations
 1. Provide a weather tight gooseneck set in Water Block Seal and secured to the deck.
 2. Flash in accordance with Manufacturers Details.
 - F. Scuppers
 1. Provide new PVC coated welded watertight scuppers.
 2. Set welded watertight scupper in Water Block Seal and secure to the structure.
 3. Flash in accordance with Manufacturers and Plan details.
 - G. Expansion Joints
 1. Install as shown on roof drawings in accordance with Manufacturers details.
- 3.10 FLASHING - WALLS, PARAPETS, MECHANICAL EQUIPMENT CURBS, SKYLIGHTS, etc.
- A. General:

Using the longest pieces practical, flash all walls, parapets, curbs, etc., a minimum of 8" high per Manufacturers Details. When flashings will not achieve a minimum 8" finished flashing height, contact manufacturer for recommended details and approvals and notify specifier/owner of conditions.
 - B. Evaluate Substrate:

Evaluate the substrate and overlay per Manufacturers specifications as necessary.
 - C. Where it occurs, remove excessive asphalt to provide a smooth, sound surface for new flashings.
 - D. Apply PVC Bonding Adhesive at about the same time to both the membrane flashing and the surface to which it is being bonded so as to allow approximately the same drying time. Apply Bonding Adhesive by rolling the adhesive on to the mating surfaces evenly, avoiding globs or puddles.
 - E. Roll the flashing into the adhesive evenly and carefully so as to minimize wrinkles.
 - F. To ensure proper contact, compress the flashing to the substrate with a stiff push broom.
 - G. Provide termination directly to the vertical substrate as shown in Plan details.
 - H. Install PVC T-Joint covers at field and flashing splice intersections.
 - I. Install intermediate flashing attachment for walls greater than 24".

1.11 FLASHING - ROOF EDGE METALS

- A. Flash all roof edges using materials as outlined in specifications and Plan Details.

- B. Use manufacturers coated PVC metal for drip edge, scuppers and similar terminations as shown in plan details.

1.12 ROOF WALKWAYS

- A. Walkways shall be PVC Walkway 180 Mil. Thick material. Heat weld the perimeters of the walkway material to the PVC membrane per Manufacturers requirements. Place walk pad 36" wide minimum along three sides of working side of HVAC units and other serviced equipment. Place walk pad 36" wide minimum along access side(s) of all roof hatches, roof ladders, and other roof access points.

1.13 CLEAN-UP

- A. Clean all contaminants from building and surrounding areas.
- B. Remove trash, debris, equipment from project site and surrounding areas.
- C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and conform to their documented instructions.
- D. Repair or replace damaged building components or surrounding areas to the satisfaction of the building owner.

END OF SECTION

SECTION 07620

SHEET METAL FLASHING. ETC.

PART ONE: GENERAL

1.01 WORK INCLUDED

- A. All flashing work including, pitch pockets, ventilation pipes, cap and base flashings, fascia, etc.
- B. All sheet metal work including flashings as shown on drawings.
- C. All other sheet metal work indicated on the drawings or that may be required due to removal work and/or cutting and patching necessary to install all the work of this contract.

1.02 RELATED WORK

PVC Roofing

1.03 REFERENCE STANDARDS

- A. FS Tf -S-00230C -Sealing Compound: Elastomeric Type, Single Component.
- B. FS SS-C--0153a –Cement, Bituminous, Plastic -Type 1.
- C. ASTM for Galvanized Steel sheet and strip.

PART TWO: PRODUCTS

2.01 SHEET METALS

- A. Galvanized and pre-painted steel sheets shall be specified in minimum thickness and gauges as follows:

<u>Minimum Thickness</u>	<u>US Standard Gauge</u>	<u>Weight Per S.F. .</u>
.025	24	1.05
.0313	22	1.31
.0375	20	1.47

2.02 ACCESSORY MATERIALS AND COMPONENTS

- A. Fasteners: Stainless steel screws and nails of type and length suitable for application and as recommended by roofing manufacturers.

- B. Solder and Flux: Type recommended for materials being used.
- C. Bituminous Paint: Acid and Alkali resistant type, black color.
- D. Sealant: One component silicone conforming to requirements of FS Tf -S-00230; non-staining; non-bleeding; non-sagging; of color selected by the Architect.

2.03 FABRICATION

- A. Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- B. Form sections in 8 foot lengths. Make allowance for expansion at joints.
- C. Seams are to be flat lock type except corners. Fabricate corners minimum 18 inches x 18 inches mitered, soldered or welded, and sealed as one piece.
- D. Wipe and wash clean, soldered joints, to remove traces of flux immediately after soldering.
- E. Hem exposed edges of flashings on underside 1 1/2 inch.
- F. Fabricate flashings to allow toe to extend minimum number of inches horizontally over roofing gravel, and return brake edge.
- G. Back paint flashing with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals.
- H. Paint exposed flashing and trim as per drawings and painting and metal fabrications sections.

PART THREE: EXECUTION

3.01 INSTALLATION

- A. Secure flashing in place using specified type fasteners. When using exposed fasteners, they are to be same finish as flashing.
- B. Apply sealing compound at junctions.
- C. Lock seams and end joints. Fit flashings tight in place. Make corners square, surfaces true and straight in planes and lines accurate to profiles.

3.02 GUARANTEE

Guarantee in writing the materials and workmanship for a period of twenty years from the date of substantial completion of the project. Should defects occur during this time, promptly make necessary repairs or replacements at no cost to the Owner.

END OF SECTION

SECTION 07920

SEALANTS & CAULKING

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. The purpose of caulking and sealants in this Work is to provide a positive barrier against penetration of air and moisture at joints between items where such sealing is essential to continued integrity of the barrier.
- B. Such caulking and sealing will normally be required under the work of various sections of these Specifications but shall be performed in strict accordance with the provisions of this Section.
- C. Read all specifications and examine all drawings thoroughly for sealant applications required. In addition, the following list of items to be caulked or sealed is intended to be used as a guide in determining the extent of Work to be furnished under this Section and is not guaranteed to be complete.
 - 1. Perimeters of all door, window and other frames.
 - 2. Control joints at gypsum board walls.
 - 3. Joint where finish terminates at other materials.
 - 4. Interior joints between door and window frames and walls.
 - 5. All floor/wall, floor/ceiling and door frame/wall joints and at perimeter of wall, ceiling or floor mounted accessories and equipment.

1.2 RELATED WORK DESCRIBED ELSEWHERE: Special requirements for caulking and sealants are described in various other sections of these specifications.

1.3 QUALIFICATIONS OF APPLICATORS: Installation of caulking and sealants shall be performed only by workers thoroughly skilled and specially trained in the techniques of caulking, and who are completely familiar with the published recommendations of the manufacturer of the caulking material being used.

1.4 REJECTION OF INSTALLED CAULKING AND SEALANTS: Indication of lack of skill on the part of installers shall be sufficient grounds for the Architect to reject installed caulking or sealants, and to require immediate removal and complete reinstallation at no additional cost to the Owner.

1.5 SUBMITTALS:

- A. Comply with the requirements of Section 013300.

- B. Submit manufacturer's descriptive literature for each type of joint sealant required. Include color charts for color approval by Architect.

1.6 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials to the project site in original unopened containers with labels stating manufacturer, product name and designation, color, expiration period for use, pot life, curing time and mixing instructions for multicomponent materials.
- B. Store all caulking and sealing materials and equipment under conditions recommended by its manufacturer.
- C. Do not use materials stored for a period of time exceeding the maximum recommended shelf-life of the material.
- D. Use all means necessary to protect caulking and sealant materials before, during, and after installation and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

1.7 PROJECT CONDITIONS: Do not proceed with installation of joint sealants under the following conditions:

- A. When ambient and substrate temperature conditions are outside the limits permitted by the sealant manufacturer or below 40 degrees F.
- B. When joint substrates are wet due to rain, frost, condensation or other causes.

PART 2 – PRODUCTS:

2.1 GENERAL:

- A. COMPATIBILITY: Provide joint sealers, joint fillers and other related materials that are compatible with one another and with joint substrates for the service and application shown or implied.
- B. COLORS: If not otherwise indicated, provide color of exposed joint sealers to closely match finish color of substrates.

2.2 ELASTOMERIC JOINT SEALANTS:

- A. ELASTOMERIC SEALANT: Single or multi-part silicone, polysulfide, or urethane sealant; Type M or S, Grade NS, chemically curing and complying with ASTM C920.
- B. SANITARY SILICONE SEALANT: All sealant for use around fixtures, and at wall and floor joints at potentially wet indoor conditions as shall be one part silicone, SCD 1702 sanitary sealant as manufactured by General Electric, or equivalent product suitable for this usage.
- C. All ½ inch expansion joints at the exterior of the building where concrete walks abut the building, expansion joints in concrete walk, or where sidewalks abut curbs, shall be sealed with a nontracking two-part polyurethane, self-leveling sealant similar to “Sonolastic Paving Joint Sealant: manufactured by Sonneborn. Asphalt expansion strips shall be cut back below the surface and a backup separator or polyethylene rod installed. Install sealant in strict conformance with manufacturer’s recommendations.
- D. Equipment: All caulking and sealing equipment shall be only such equipment as is specifically recommended by the manufacturer or the material being installed.

PART 3 – EXECUTION:

3.1 INSPECTION:

- A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that caulking and sealing may be installed in accordance with the manufacturer’s recommendations.

3.2 DISCREPANCIES:

- A. In the event of discrepancy, immediately notify the Architect.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 CHOICE OF CAULKING AND SEALING MATERIAL: Use only that caulking and sealing material which is best suited to the installation and is so recommended by the sealant material manufacturer.

3.4 JOINTS:

A. WIDTH: Minimum $\frac{1}{4}$ inch X $\frac{1}{4}$ “

B. DEPTH: Do not exceed width of joint from $\frac{1}{4}$ “ to $\frac{1}{2}$ “. Maximum depth $\frac{1}{2}$ “

3.5 BACK-UP MATERIALS:

A. Verify the compatibility of filler material with sealant material before installation.

B. Use filler material to control depth of joint to within $\frac{1}{2}$ “ of surface. Allow for minimum 30% compression when inserted.

C. For joints that use regular joint backing, use bond breakers to prevent adhesion to back of joint.

D. All filler materials shall be non-oily, non-staining, back-up filler such as polyethylene foam rod, expanded polyurethane, neoprene, or other filler completely compatible with the sealant material.

3.6 APPLICATION OF CAULKING AND SEALANTS: Install in strict accordance with the manufacturer's recommendations, taking care to produce beads of proper width and depth, to tool as recommended by the manufacturer, and to remove all surplus material.

---END OF SECTION---

SECTION 08100

Hollow Metal Doors and Frames

PART 1 - GENERAL

- 1.1 **WORK INCLUDED:** The hollow metal door work and frames required for this Work are scheduled and indicated on the drawing.
- 1.2 **RELATED WORD DESCRIBED ELSEWHERE:**
- | | |
|--------------------|---------------|
| A. Finish Hardware | Section 08700 |
| B. Glass & Glazing | Section 08810 |
| C. Finish Painting | Section 09900 |
- 1.3 **QUALIFICATIONS OF INSTALLERS:** For actual installations of metal doors and frames, and installation of finish hardware on metal doors and frames, use only personnel who are thoroughly trained and experienced in the skills required and who are completely familiar with the manufacturer's recommended methods of installation as well as the requirements of this Work.
- 1.4 **CODE AND STANDARDS:** In addition to complying with all pertinent codes and regulations.
- A. Manufacture all labeled doors in strict accordance with the specifications and procedures of Underwriters' Laboratories, Inc. Such doors shall bear the label of U.L., Inc.
- B. In Guarantee and Shop Drawings, comply with nomenclature established in American National Standards Institute publication A121.1-1967 "Nomenclature for Steel Doors and Steel Door Frames".
- 1.5 **SUBMITTALS:** Before any metal doors and frames are delivered to the job site and in accordance with Section 01300 of these specifications, submit Shop Drawings covering each type of door and frame, frame conditions, all construction details, gages, fastening devices, reinforcing, complete anchorage details, type of prime, etc. supplemented by suitable schedules covering all doors and frames.
- 1.6 **PROTECTION:**
- A. Deliver, store, and handle all metal doors and frames in a manner to prevent damage and deterioration.

- B. Provide packaging such as cardboard or other containers, separators, handling, spreaders, and paper wrappings as required to completely protect all metal doors and frames during transportation and storage.
- C. Store doors upright, in a protected dry area, at least one inch off the ground and with at least ¼ inch air space between individual pieces, protect all surfaces as required.
- D. Use all means necessary to protect the installed work and materials of all other trades.

1.7 **REPLACEMENTS:** In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and no additional cost to the Owner.

PART II-PRODUCTS:

2.1 **GENERAL:** Hollow metal doors and frames shall be the products of one of the following manufacturers, subject to compliance with the requirements of this Specification, and shall be the product of one manufacturer throughout the project:

- A. Amweld Division of the American Welding & Manufacturing Co.
- B. The Ceco Corporation.
- C. Current Mfg. Inc.
- D. The Steelcraft Manufacturing Co.
- E. Western Hol-O-Metal Corporation

2.2 **FULL FLUSH METAL DOORS:**

- A. TYPE AND DESIGN: All metal doors shall be full-flush design, in the dimensions and types shown this Project Manual, labeled or non-labeled having a certified fire rating as indicated on the Door Schedule.
 - 1. Doors to be equal in construction to 747T Series Extra Heavy Duty Full Flush Seamless Doors as manufactured by Curries Mfg. Inc.
 - 2. Doors shall be manufactured of the finest quality 16 gauge cold rolled stretcher leveled steel.
 - 3. Doors to have 20 gauge internal stiffeners, 14 gauge channel lock rail, 12 gauge channel hinge rail end 16 gauge top and bottom closure channels.
 - 4. All spaces between stiffener ribs to be filled with fiberglass insulation.
 - 5. Doors to have beveled lock edge.

6. Doors to be properly reinforced for hardware specified in Section 08700 of these specifications, including 12 gauge reinforcement at closures and 14gauge reinforcement at butts and locksets.
 7. Edge seams shall be wire welded full length and ground smooth.
- B. FINISHES: Pre-clean and shop prime each door with rust inhibitive primer in preparation for finish painting which will be performed at the job site under Section 09900 of these Specifications.
- C. FINISH HARDWARE: Secure templates from the finish hardware supplier and accurately install, or make provisions for all finish hardware at the factory.

2.3 **METAL FRAMES:**

- A. GENERAL: All metal frames shall be accurately fabricated to match the doors to be installed in them.
- B. TYPE AND DESIGN: All metal frames shall be 16-gauge hot rolled prime quality carbon steel in the types and sizes shown in this Project Manual and as indicated on the Door Schedule.
1. Frames shall be properly reinforced for the finish hardware described in Section 08700 of these Specifications.
 2. All frames shall be mitered and continuously arc welded with all joints ground smooth.
 3. Provide plaster guards for all hardware cutouts and three rubber silencers of all interior frames.
- C. ANCHORS: Provide 3 min. jamb anchors for each jamb of door or borrowed light frame. Anchor types shall be such as provide positive attachment to adjacent construction. Provide 14-gauge adjustable clip angle anchor at bottom of each jamb member for anchoring frame to floor.
- D. FINISHES: Pre-clean and shop prime each frame with rust inhibitive primer in preparation for finish painting which will be performed at the job site under Section 09900 of these Specifications.
- E. FINISH HARDWARE: Secure templates from the finish hardware supplier and accurately install, or make provisions for all finish hardware at the factory.

- 2.4 **OTHER MATERIALS:** All other materials not specifically described but required for a complete and proper installation of hollow metal doors and frames shall be only as recommended by the manufacturer and subject to the approval of the Architect.

PART III – EXECUTION:

3.1 INSPECTION:

- A. Prior to installation of metal doors and frames, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that metal doors and frames may be installed in strict accordance with all pertinent codes and regulations, the original design, approved Shop Drawings, and manufacturer's recommendations.

3.2 DISCREPANCIES:

- A. In the event of discrepancy, immediately notify the Architect.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 INSTALLATION:

- A. METAL DOORS AND FRAMES: Install all metal doors and frames in strict accordance with all pertinent codes and regulations, the approved Shop Drawings, and the Manufacturer's recommendations, anchoring all components firmly in position for long life under hard use.
- B. FINISH HARDWARE: Install all finish hardware in strict accordance with the manufacturer's recommendations, eliminating all hinge-bound conditions and making all items smoothly operating and firmly anchored into position.

---END---

Section 08212
Wood Panel Doors

PART 1. GENERAL

1.1 SECTION INCLUDES

Wood doors non-rated and fire-rated

- A. Solid wood panel doors

1.2 RELATED SECTIONS

- A. Section 06200 - Finish Carpentry

1.3 REFERENCES AND REGULATORY REQUIREMENTS

- A. ASTM E152 - Methods of Fire Tests and Door Assemblies.
- B. NFPA 252 - Standard Methods for Fire Assemblies.
- C. UBC 7-2- Latest Edition
- D. IBC- Latest Edition
- E. UL 10 (c) - Fire Tests for Door Assemblies - Positive Pressure
- F. UL 10 (b) - Fire Tests for Door Assemblies - Neutral Pressure
- G. NFPA 80 - Fire Doors and Windows.
- H. Quality Standards:
 - 1. WDMA Industry Standard I.S. 1A-04
 - 2. ANSI A115. W Series, Wood Door Hardware Standards. (American National Standard Institute)
 - 3. LEED Standards as noted
- J. Labeling Agencies
 - 1. Intertek Testing Services-Warnock Hersey (ITS-WH) [or]
 - 2. Underwriters Laboratories, Inc. (UL) (Neutral pressure only)

1.4 SUBMITTALS

- A. Shop drawings: Indicate location, size, and hand of each door; elevation of each kind of door; location and extent of hardware blocking; and other pertinent data.
 - 1. Indicate dimensions and locations of mortises and holes for hardware.
 - 2. Indicate dimensions and locations of cutouts.
 - 3. Indicate requirements for panels.
 - 4. Indicate doors to be factory finished and finish requirements.
 - 5. Indicate fire ratings for fire doors.
- B. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:
 - 1. Faces for Factory Finished doors: Show the full range of colors available for stained finishes.
- C. Samples for Verification:
 - 1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish,

provide one piece of the expected finished work.

1.5 QUALITY ASSURANCE

- A. Source limitations: Obtain wood panel doors through one source from a single manufacturer.
- B. Quality standard: Comply with WDMA I.S.1-A 04
- C. Fire-rated Doors: Doors complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 UBC 7-2-1997 (Positive Pressure)

1.6 DELIVERY STORAGE AND HANDLING AND SITE CONDITIONS

- A. Deliver, store, protect and handle products under provisions of WDMA.
- B. Package doors individually and wrap bundles of doors. Inspect for damage. Do not store in damp or wet areas. HVAC systems should be operating and balanced prior to arrival of doors. Acceptable humidity shall be no less than 25% nor greater than 55%.
- C. Certain wood species are light sensitive. Protect doors from exposure to natural and artificial light after delivery.

1.7 WARRANTY

- A. Provide manufacturer's warranty for Wood Panel Doors:
 - 1. Full Lifetime Warranty

PART 2. PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with requirements, provide products by one of the following:
 - 1. Wood Panel doors:
 - a. Spanish Pueblo Doors
 - b. Simpson Doors, Inc.
 - c. Albuquerque Door Co.
- B. Substitutions allowed only with written approval by architect prior to bid date.

2.2 DOOR CONSTRUCTION, GENERAL

- A. WORKMANSHIP
 - 1. Comply with WDMA I.S. 1A-04
- B. PERFORMANCE STANDARD

1. Comply with WDMA I.S. 1A-04 Extra Heavy Duty
- C. DOORS FOR TRANSPARENT FINISH:
1. Grade: Premium, with A Grade Faces
 2. Wood veneer Species and Cut:
 3. Match between veneer leaves: Book match,
 4. Assembly of spliced veneers: Running
 5. Pair and Set match: Provide for doors hung in same opening or separated only by mullions.
 6. Door with Transom: Continuous match
- D. Stiles: Same or compatible species as faces.
- E. Interior doors:
1. Stiles and rails bonded to core, then entire unit abrasive planed before veneering.
- F. Rating: Positive pressure Category A

2.3 SOLID-CORE DOORS

A. NON-FIRE RATED WOOD DOORS

1. Non-rated and 20-minute rated
 - a. LD-2 Particleboard, PC-5
 - b. Structural Composite Lumber, SCLC-5
 - c. Stave lumber core, SLC-5
2. Provide manufacturers standard laminated-edge construction with improved screw-holding capability and split resistance.
3. 20-minute rated pairs:
 - a. Provide with fire-retardant stiles that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.
 - b. As required by manufacturer to permit positive pressure "S" label per Category H.

2.4 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:
1. WDMA prefit clearances for factory fit doors
 2. NFPA 80 for fire rated doors
 3. Manufacturers hardware templates

- B. Factory machine doors for hardware that is not surface applied. Comply with final hardware schedules, door frame Shop Drawings, and hardware templates.
 - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standard for kind(s) of doors(s) required.
 - 1. Light openings: Trim openings with moldings of material and profile indicated.
 - 2. Louvers: Factory install louvers in prepared openings.
- D. Apply appropriate labels.

2.5 FACTORY FINISH

- A. General: Comply with WDMA finish requirements.
- B. Finish doors at factory.
- C. Transparent Finish:
 - 1. Finish: WDMA TR-6 catalyzed polyurethane.
- D. Factory finished doors to be installed just prior to substantial completion.

2.6 ACCESSORIES

- A. **LOUVERS**
 - 1. Wood louvers as detailed on the elevations.
 - 2. Louvers to be furnished by the door manufacturer.
 - 3. Metal Louvers: Specified in Section 10255.
- B. **APPLIED MOLDINGS:**
 - 1. As selected from manufacturer's standard profiles and install as detailed.
 - 2. Applied moldings to be affixed to the door without the use of nails or staples.

PART 3. EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed frames before hanging doors.
 - 1. Verify that frames comply with indicated requirements for type, size, location and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects prior to hanging.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Manufacturer's written instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.
- C. Align all doors for uniform clearance at each edge.
- D. Factory finished doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

- A. Operation: Adjust all doors to swing and operate freely.

END OF SECTION

SECTION 08555
ALUMINUM CLAD WOOD WINDOW UNITS

PART 1 GENERAL

1.01 SUMMARY

A. Work Included: Furnish and install factory-assembled aluminum-clad casement, picture, awning window units, French Door units, including glass and glazing, hardware, and accessories; as indicated on Drawings and as specified here in.

B. Related Sections: Other Specification sections that directly relate to the work of this Section include, but are not limited to, the following:

1. Section 06100, Rough Carpentry: Wood framing.
2. Section 07210, Building Insulation: Batt and blanket insulation.
3. Section 07900, Joint Sealers: Perimeter sealants.
4. Section 09900, Painting: Painting and finishing.

1.02 PERFORMANCE REQUIREMENTS

A. General: Perform testing in accordance with AAMA/WDMA 101 I.S.2-97, or CSA-A440-00.

B. Forced Entry: When tested in accordance with ASTM F588, shall be Grade 20/F-2 where applicable

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's printed product data, test reports and installation instructions.

B. Shop Drawings: Submit shop drawings for approval. Include detailed plans, elevations, details, required rough openings, anchors and accessories. Include relationship with adjacent materials. Provide installation templates for work installed by others.

C. Samples: Submit representative samples of each material that is to be exposed in the completed work. Show full color ranges and finish variations expected.

1.04 QUALITY ASSURANCE:

A. Manufacturer: For each material type required for the work of this section, provide primary materials that are the product of one manufacturer. Provide secondary or accessory materials that are acceptable to the manufacturers of the primary materials.

B. Installer: A firm with a minimum of three years experience in type of work required by this Section.

C. Mock-Up: Prior to commencing the primary work of this section, provide a mock-up of each unit type at locations acceptable to Architect. Obtain Architect's acceptance of visual qualities. Remove and replace units that are not approved. Approved mock-ups built in place may be incorporated into the finished work.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Protect from damage from weather, excessive temperatures and construction operations.

1.06 WARRANTY

A. Provide manufacturer's standard limited warranty covering the following:

1. Structural members and operating hardware are warranted against defects in material and workmanship for a period of ten years.
2. Insulating glass is warranted against material obstruction of transparency resulting from film formation or dust collection on the interior surfaces for a period of ten years and twenty years on qualifying Heat Smart Systems.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Provide units manufactured by Marvin, Pella, Windsor or approved equal.

2.02 CLAD: CASEMENT, PICTURE, SLIDING DOOR AND AWNING WINDOW UNITS

A. Clad Double Hung and casement window units: Preglazed with insulating glass meeting classifications for AAMA/WDMA 101 I.S.2-97, and CSA-A440-00. Tested for Air Leakage PASS/A-3, Water Leakage DP100/B-7, Wind Resistance/Load DP60/C-4 and as follows:

1. Glass and Glazing Type:

a. Double-glazed [and Heat Smart PLUS System 1].

2. Hardware: Roto gear operator with concealed heavy-duty hinges; sash locks; handle.

b. Concealed multi-point concealed locking mechanism.

c. Finish: painted sage green finishes.

3. Grilles:

a. Style: Standard

b. Between Glass Grilles: White Metal

c. Simulated Divided Lites: ¾", 1 1/8" or 2" Grille bars permanently applied to the interior and exterior, with airspace grilles

4. Insect Screen: Full-size; [Black] frame color.

5. Double Weatherstripping: Flexible bubble and flexible bubble with semi-rigid fin seal.

2.03 MATERIALS AND COMPONENTS

A. Frame and Door: Coastal Douglas Fir kiln-dried lumber, preservative-treated in accordance with NAFS 1/WDMA 101 I.S.-2/CSA-A440. Interior exposed surfaces are clear fir; exterior surfaces factory primed. Jamb width [4-9/16 in. (116 mm)][6-9/16 in. (166 mm)] [other]

B. Glass and Glazing: Factory sealed units of 3 mm clear glass with 1/2 in. (12 mm) airspace; wood stop at interior face and foam tape gasket at exterior face.

C. Hardware: Steel components with Truth E-Gard coating.

D. Grilles: Manufacturer's standard.

E. Insect Screen: Black anti-glare fiberglass cloth, set in aluminum frame fitted to inside of window, supplied complete with necessary hardware. Screen frame finish shall be baked enamel.

F. Finishes:

1. Exterior Aluminum Finish: Manufacturers [standard][architectural] palette; colors as selected from manufacturers clad color spectrum.

2. Interior Wood Finish: Unfinished, ready for site finishing. Refer to Section 09900, Painting.

PART 3 EXECUTION

3.01 PREPARATION

A. Examine substrates and conditions in which units will be installed. Do not proceed with installation until unsatisfactory conditions are corrected.

3.02 INSTALLATION

A. Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this section. Coordinate installation with adjacent work to ensure proper sequence of construction, clearances and support.

B. Apply caulking underneath sill, install units plumb, level, complete with drip flashing and in proper relationship with adjacent work. Install without twisting, bowing or springing. Anchor units securely in place.

3.03 ADJUSTING AND CLEANING

A. Adjust hardware and operating parts for proper operation.

B. Clean exposed surfaces using manufacturer recommended materials and methods. Remove labels and visible markings. Remove and replace work that cannot be successfully cleaned.

C. Touch-up damaged coatings and finishes using non-abrasive materials and methods recommended by manufacturer. Eliminate all visible evidence of repair.

END OF SECTION

SECTION 08700

FINISH HARDWARE

PART 1 - GENERAL

1.1 WORK INCLUDED:

- A. Hardware has been assigned to the various doors required for this Work, as described in the Hardware Schedule as found on the Drawings. The hardware groups are described in detail in this Section of these Specifications.
- B. Unless otherwise approved by the Architect, furnish all finish hardware described in the Schedules and all other finish hardware not described but required for a complete and operable facility.

1.2 QUALIFICATIONS OF SUPPLIERS: The finish hardware supplier shall have in his employ an ABC member of the American Society of Hardware Consultants who shall be made available for consultation at no additional cost to the Owner during course of construction.

1.4 REVIEW BY AHC: The AHC member shall be present at completion of the Work, shall check the installation of all finish hardware, shall make, all minor adjustments required and supervise all hardware replacements required, and shall report to the Architect on completeness of the installation. This report will be required prior to final inspection.

1.5 SUBMITTALS:

- A. Make all submittals, and re-submittals if necessary, in accordance with the provisions of Section 01300 of these Specifications.
- B. **HARDWARE SCHEDULE:** Before any finish hardware is ordered or purchased for this Work, submit to the Architect for his approval, a complete schedule of all finish hardware proposed to be furnished for this Work, giving manufacturer's name and catalog number for each item.
- C. This shall in no way be construed as permitting substitutions of items for the items specified.

1.6 MANUFACTURER'S RECOMMENDATIONS: Prior to installation, deliver to the installing personnel complete recommendations from the manufacturers regarding installation methods.

1.7 **PACKAGING:**

- A. Furnish all finish hardware with each unit clearly marked or numbered in accordance with the hardware schedule.
- B. Pack each item complete with all necessary pieces and fasteners.
- C. Properly wrap and cushion each item to prevent scratches during delivery and storage.

1.8 **DELIVERY:** Deliver all finish hardware to the installers in timely manner to ensure orderly progress of the total work.

PART 2 - PRODUCTS:

2.1 **GENERAL:**

- A. Furnish all finish hardware with all necessary screws, bolts, and other fasteners of suitable size and type to anchor hardware in position for long life under hard use.
- B. Furnish fastenings where necessary with expansion shields, toggle bolts, sex bolts, and other anchors approved by the Architect, according to the material to which the hardware is to be applied and the recommendations of the hardware manufacturer.
- C. All fastenings shall harmonize with the hardware as to material and finish.

2.2 **KEYING:**

- A. Construction Keying: Provide a method independent of the final keying system for securing the building during construction.
- B. Final Keying System:
 - 1. Stamp all keys "DO NOT DUPLICATE".
 - 2. Master key all locks in accordance with the Architect's instruction.

2.3 **MANUFACTURERS:** Catalog numbers used in the hardware schedule were taken from the indicated manufacturers and all finish hardware shall be the hardware specifically described or by prior approved equal suppliers.

2.4 **OTHER MATERIALS:** All other materials, not specifically described but required for a complete and proper installation of finish hardware, shall be furnished new, first quality of their respective kinds, and subject to approval of the Architect.

PART 3 – EXECUTION:

- 3.1 DELIVERIES: Stockpile all items sufficiently in advance to ensure their availability and make all necessary deliveries in a timely manner to ensure orderly progress of the total Work.
- 3.2 INSPECTION OF INSTALLATION: Upon completion of the installation, and as a condition of its acceptance, deliver to the Architect a report signed by the AHC member stating that his inspection was made, that all adjustments recommended by him have been completed, and that all finish hardware furnished under this Section has been installed in its optimum working condition.
- 3.3 INSTALLATION:
- A. Set all thresholds in a full bed of mastic.
 - B. Provide and install plaster boxes for all strikes on locksets, latch sets and dead bolts.
 - C. Install all hardware items in accordance with manufacturer's installation instructions.
 - D. Provide full one year warrantee on all hardware.

---END OF SECTION---

SECTION 08710
DOOR HARDWARE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes:

- 1. Mechanical door hardware for:
 - a. Swinging doors.
 - b. Sliding doors.
- 2. Field verification, preparation and modification of existing doors and frames to receive new door hardware.
- 3. Lead-lining door hardware items required for radiation protection at door openings.
- 4. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.

- B. Exclusions: Unless specifically listed in hardware sets, hardware is not specified in this section for:

- 1. Windows
- 2. Cabinets (casework), including locks in cabinets
- 3. Signage
- 4. Toilet accessories
- 5. Grates

C. Related Sections:

- 1. Division 01 Section "Alternates" for alternates affecting this section.
- 2. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.

3. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.

1.03 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Key Systems and Nomenclature

C. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties

1.04 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 requirements.
2. Highlight, encircle, or otherwise specifically identify on submittals deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.
3. Prior to forwarding submittal, comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.
4. Door Hardware Schedule: Submit schedule with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, include:
 - a. Door Index; include door number, heading number, and Architects hardware set number.
 - b. Quantity, type, style, function, size, and finish of each hardware item.
 - c. Name and manufacturer of each item.
 - d. Fastenings and other pertinent information.
 - e. Location of each hardware set cross-referenced to indications on Drawings, including to and from room locations.
 - f. Explanation of all abbreviations, symbols, and codes contained in schedule.
 - g. Mounting locations for hardware.

- h. Door and frame sizes and materials.
- i. Name and phone number for local manufacturer's representative for each product.
- j. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and access control components). Operational description should include operational descriptions for: egress, ingress (access), and fire/smoke alarm connections.
 - 1) Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work that is critical in Project construction schedule.

5. Key Schedule:

- a. After Keying Conference, provide keying schedule listing levels of keying as well as explanation of key system's function, key symbols used and door numbers controlled.
 - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
 - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
 - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
 - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion.
 - 1) Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
 - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
6. Templates: After final approval of hardware schedule, provide templates for doors, frames and other work specified to be factory or shop prepared for door hardware installation.

B. Closeout Submittals:

- 1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
 - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
 - b. Catalog pages for each product.
 - c. Factory order acknowledgement numbers (for warranty and service)

- d. Name, address, and phone number of local representative for each manufacturer.
- e. Parts list for each product.
- f. Final approved hardware schedule, edited to reflect conditions as-installed.
- g. Final keying schedule
- h. Copies of floor plans with keying nomenclature
- i. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.
- j. Copy of warranties including appropriate reference numbers for manufacturers to identify project.

1.05 QUALITY ASSURANCE

- A. Supplier Qualifications and Responsibilities: Recognized architectural hardware supplier with record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
 - 1. Warehousing Facilities: In Project's vicinity.
 - 2. Scheduling Responsibility: Preparation of door hardware and keying schedules.
 - 3. Engineering Responsibility: Preparation of data for electrified door hardware, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
 - 4. Coordination Responsibility: Assist in coordinating installation of electronic security hardware with Architect and electrical engineers and provide installation and technical data to Architect and other related subcontractors.
 - a. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.
- B. Architectural Hardware Consultant Qualifications: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
 - 1. For door hardware, DHI-certified, Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC).
 - 2. Can provide installation and technical data to Architect and other related subcontractors.
 - 3. Can inspect and verify components are in working order upon completion of installation.
 - 4. Capable of producing wiring diagrams.
 - 5. Capable of coordinating installation of electrified hardware with Architect and electrical engineers.

- C. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.
- D. Fire-Rated Door Openings: Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
- E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with governing accessibility regulations cited in “REFERENCES” article, herein.
- F. Keying Conference
 - 1. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
 - a. Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
 - b. Preliminary key system schematic diagram.
 - c. Requirements for key control system.
 - d. Requirements for access control.
 - e. Address for delivery of keys.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.
 - 1. Deliver each article of hardware in manufacturer’s original packaging.
- C. Project Conditions:
 - 1. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
 - 2. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D. Protection and Damage:

1. Promptly replace products damaged during shipping.
2. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work.
3. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.

E. Deliver keys to Owner as directed by Owner.

1.07 WARRANTY

- A. Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Beginning from date of Substantial Completion, for durations indicated.
 - a. Closers:
 - 1) Mechanical: 30 years
 - b. Locksets:
 - 1) Mechanical: 10 years.
 2. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.

1.08 MAINTENANCE

- A. Maintenance Tools: Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The Owner requires use of certain products for their unique characteristics and project suitability to insure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."
1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

- B. Approval of manufacturers and/or products other than those listed as “Scheduled Manufacturer” or “Acceptable Manufacturers” in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
- C. Approval of products from manufacturers indicated in “Acceptable Manufacturers” is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer’s product.
- D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fasteners

- 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
 - 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
 - 3. Provide concealed fasteners for hardware units exposed when door is closed except when no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless thru-bolts are required to fasten hardware securely. Review door specification and advise Architect if thru-bolts are required.
 - 4. Install hardware with fasteners provided by hardware manufacturer.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
- 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product: Ives 5BB series (IVE).
- 2. Acceptable Manufacturers and Products: Hager BB series, McKinney TB/T4B series, Stanley FBB Series.

B. Requirements:

- 1. Provide hinges conforming to ANSI/BHMA A156.1.
- 2. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:

- a. Exterior: Standard weight, steel, 4-1/2 inches (114 mm) high
- b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
- 3. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
 - a. Exterior: Heavy weight, steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
- 4. 2 inches or thicker doors:
 - a. Exterior: Heavy weight, steel, 5 inches (127 mm) high
 - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
- 5. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
- 6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
- 7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-Ferrous Hinges: Stainless steel pins
 - c. Out-Swinging Exterior Doors: Non-removable pins
 - d. Out-Swinging Interior Lockable Doors: Non-removable pins
 - e. Interior Non-lockable Doors: Non-rising pins
- 8. Width of hinges: 4-1/2 inches (114 mm) at 1-3/4 inch (44 mm) thick doors, and 5 inches (127 mm) at 2 inches (51 mm) or thicker doors. Adjust hinge width as required for door, frame, and wall conditions to allow proper degree of opening.

2.04 CONTINUOUS HINGES

A. Aluminum Geared

- 1. Manufacturers:
 - a. Scheduled Manufacturer: Ives (IVE).
 - b. Acceptable Manufacturers: Select, Stanley.
- 2. Requirements:
 - a. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
 - b. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
 - c. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
 - d. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.

- e. On fire-rated doors, provide aluminum geared continuous hinges that are classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
- f. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with sufficient number and wire gage to accommodate electric function of specified hardware.
- g. Install hinges with fasteners supplied by manufacturer.
- h. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 CYLINDRICAL LOCKS – GRADE 1

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product: Schlage ND series (SCH) – Owner’s Standard.

B. Requirements:

- 1. Provide cylindrical locks conforming to ANSI/BHMA A156.2 Series 4000, Grade 1, and UL Listed for 3 hour fire doors.
- 2. Cylinders: Refer to “KEYING” article, herein.
- 3. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with 1/2 inch latch throw. Provide proper latch throw for UL listing at pairs.
- 4. Provide locksets with separate anti-rotation thru-bolts, and no exposed screws.
- 5. Provide independently operating levers with two external return spring cassettes mounted under roses to prevent lever sag.
- 6. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
- 7. Provide electrified options as scheduled in the hardware sets.
- 8. Lever Trim: Solid cast levers without plastic inserts and wrought roses on both sides.

2.06 EXIT DEVICES

A. Manufacturers and Products:

- 1. Scheduled Manufacturer and Product: Von Duprin 99 series (VON) – Owner’s Standard.

B. Requirements:

- 1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
- 2. Cylinders: Refer to “KEYING” article, herein.

3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer's approved strikes.
8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors, or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.

2.07 CYLINDERS

A. Manufacturers:

1. Scheduled Manufacturer: Schlage Primus (SCH) – Owner's Standard.

B. Requirements:

1. Provide interchangeable cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

C. Construction Keying:

1. Temporary Construction Cylinder Keying.
2. Replaceable Construction Cores.
 - a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.
 - 1) 3 construction control keys
 - 2) 12 construction change (day) keys.
 - b. Material Supplier and Owner or Owner's Representative will replace temporary construction cores with permanent cores.

2.08 KEYING

- A. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- B. Provide cylinders/cores keyed into Owner's existing keying system managed by Owner's locksmith, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
- C. Requirements:
 - 1. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
 - a. Master Keying system as directed by the Owner.
 - 2. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
 - 3. Provide keys with the following features:
 - a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
 - b. Patent Protection: Keys and blanks protected by one or more utility patent(s).
 - c. Geographically Exclusive: Where High Security or Security cylinders/cores are indicated geographically exclusive key system complying with the following restrictions.
 - 4. Identification:
 - a. Mark permanent cylinders/cores and keys with applicable blind code per DHI publication "Keying Systems and Nomenclature" for identification. Do not provide blind code marks with actual key cuts.
 - b. Identification stamping provisions must be approved by the Architect and Owner.
 - c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
 - d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
 - e. Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
 - 5. Quantity: Furnish in the following quantities.
 - a. Change (Day) Keys: 3 per cylinder/core.
 - b. Permanent Control Keys: 3.
 - c. Master Keys: 6.

2.09 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer: Telkee.
2. Acceptable Manufacturers: HPC, Lund.

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
 - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
 - b. Provide hinged-panel type cabinet for wall mounting.

2.10 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product: LCN 4010/4110/4020 series (LCN) – Owner's Standard.

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. Certify surface mounted mechanical closers to meet fifteen million (15,000,000) full load cycles. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2 inch (38 mm) diameter with 11/16 inch (17 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers. When closers are parallel arm mounted, provide closers which mount within 6-inch (152 mm) top rail without use of mounting plate so that closer is not visible through vision panel from pull side.
8. Pressure Relief Valve (PRV) Technology: Not permitted.

9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI/BHMA Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.11 DOOR TRIM

A. Manufacturers:

1. Scheduled Manufacturer: Ives (IVE).
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide push plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick and beveled 4 edges. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
2. Provide push bars of solid bar stock, diameter and length as scheduled. Provide push bars of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.
3. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
4. Provide flush pulls as scheduled. Where required, provide back-to-back mounted model.
5. Provide pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.
6. Provide pull plates 4 inches (102 mm) wide by 16 inches (406 mm) high by 0.050 inch (1 mm) thick, beveled 4 edges, and prepped for pull. Where width of door stile prevents use of 4 inches (102 mm) wide plate, adjust width to fit.
7. Provide wire pulls of solid bar stock, diameter and length as scheduled.
8. Provide decorative pulls as scheduled. Where required, mount back to back with pull.

2.12 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer: Ives (IVE).
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide kick plates, mop plates, and armor plates minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes of plates:
 - a. Kick Plates: 10 inches (254 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
 - b. Mop Plates: 4 inches (102 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs
 - c. Armor Plates: 36 inches (914 mm) high by 2 inches (51 mm) less width of door on single doors, 1 inch (25 mm) less width of door on pairs

2.13 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers: Glynn-Johnson (GLY).
2. Acceptable Manufacturers: Rixson, Sargent.

B. Requirements:

1. Provide heavy duty concealed mounted overhead stop or holder as specified for exterior and interior vestibule single acting doors.
2. Provide heavy duty concealed mounted overhead stop or holder as specified for double acting doors.
3. Provide heavy or medium duty and concealed or surface mounted overhead stop or holder for interior doors as specified. Provide medium duty surface mounted overhead stop for interior doors and at any door that swings more than 140 degrees before striking wall, open against equipment, casework, sidelights, and where conditions do not allow wall stop or floor stop presents tripping hazard.
4. Where overhead holders are specified provide friction type at doors without closer and positive type at doors with closer.

2.14 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives (IVE).
2. Acceptable Manufacturers: Burns, Rockwood.

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
2. Where a wall stop cannot be used, provide universal floor stops for low or high rise options.
3. Where wall or floor stop cannot be used, provide medium duty surface mounted overhead stop.

2.15 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer: Zero International (ZER).
2. Acceptable Manufacturers: National Guard, Reese.

B. Requirements:

1. Provide thresholds, weather-stripping (including door sweeps, seals, and astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Size of thresholds:
 - a. Saddle Thresholds: 1/2 inch (13 mm) high by jamb width by door width
 - b. Bumper Seal Thresholds: 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width
4. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

2.16 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer: Ives (IVE).
2. Acceptable Manufacturers: Burns, Rockwood.

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

2.17 FINISHES

A. Finish: BHMA 626/652 (US26D); except:

1. Continuous Hinges: BHMA 628 (US28)
2. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
3. Protection Plates: BHMA 630 (US32D)
4. Overhead Stops and Holders: BHMA 630 (US32D)

5. Door Closers: Powder Coat to Match
6. Wall Stops: BHMA 630 (US32D)
7. Latch Protectors: BHMA 630 (US32D)
8. Weatherstripping: Clear Anodized Aluminum
9. Thresholds: Mill Finish Aluminum

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 2. Custom Steel Doors and Frames: HMMA 831.
 3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated or one

hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

- H. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Replace construction cores with permanent cores as indicated in keying section.
- I. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- J. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- K. Closer/holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
- L. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- M. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
- N. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- O. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- P. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 FIELD QUALITY CONTROL

- A. Engage qualified manufacturer trained representative to perform inspections and to prepare inspection reports.
 - 1. Representative will inspect door hardware and state in each report whether installed work complies with or deviates from requirements, including whether door hardware is properly installed and adjusted.

3.04 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final

operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.05 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.06 DOOR HARDWARE SCHEDULE

- A. Provide Hardware items referenced in a Hardware Schedule. Refer to the above-specifications for special features, options, cylinders/keying, and other requirements.

END OF SECTION

SECTION 08810
GLASS & GLAZING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS:

Related Documents: The General Conditions governing all contracts and the Specific Requirements shall apply to all work of this Section.

1.2 WORK INCLUDED:

Furnish all labor, materials, tools and equipment required to perform the work of this Section as shown on the Drawing and/or as specified herein. In general the work shall include but not necessarily be limited to the following:

A. All glazing of Aluminum doors and windows.

1.3 RELATED WORK OF OTHER SECTIONS:

The following related items of work are specified to be provided under other sections of the Specifications.

SECTION 8 - ENTRANCE DOORS & WINDOWS

1.4 SHOP DRAWINGS

Submit shop drawings including details of construction, complete schedules, relationship and details of supporting structures, attachment, and catalogue data for Architect's approval.

1.5 SUBMITTALS

A. Samples:

1. Submit 6' x 6' product samples of each type of glass for Architect's approval.
2. Submit ½ pint of glazing compound.

B. Manufacturer's Data:

1. Glass: submit manufacturer's specifications and installation instructions for each type of glass to be used.
2. Glazing compound: submit manufacturer's specifications and installation instructions for each type of glazing compound to be used.

C. Certificates:

1. When glass is not cut to size by manufacturer and is furnished unlabeled from local stock, submit an affidavit certifying quality, thickness, type and manufacturer of glass furnished.
2. Tempered glass to have manufacturer's label etched into glass.
3. All other bronze tinted and clear glasses shall bear manufacturer's labels and certifications.

1.6 QUALITY ASSURANCE:

- A. Contractor shall replace at no extra cost to the Owner all broken glass during the life of the Contract.
- B. Standards: All material shall conform to the appropriate test standards and to those following:
 - 1. Fed. Spec. DD-9451a: All glass
 - 2. Fed. Spec. TT-G-00410-C: Glazing Compound

PART 2 - PRODUCTS

2.1 GLASS

- A. Glass shall be insulated units shall be manufactured by PPG Industries or app. Eq. And as follows:
 - 1. Inside glass: Solarcool Bronze #2, 1/4" thick.
 - 2. Exterior glass: Solarban 70 #3, 1/4" thick.
- B. Glass in Entrances shall be as manufactured by PPG Industries or app. Eq. And as follows:
 - 1. Single pane glass: Clear 1/2" thick with 80% transmittance.
- C. All glass shall be tempered and as manufactured by PPG Industries or app. Eq.
- D. Each lite shall bear manufacturer's label as to quality.
- E. Glazing compound shall be in accordance with Fed. Spec. above, latest edition, and shall be tinted to match the color of surrounding frames.
- F. Fasteners: Glazing clips shall be No. 18 W & M ga., galvanized steel glazing clips for Aluminum frame and coppered steel clips for steel frames.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Glass shall be secured in metal frames with glazing clips, spaced not over 18" on center. Glass shall be properly bedded in glazing compound and back puttied. A minimum of 4 clips shall be used per lite. Contractor shall follow manufacturer's recommendations regarding setting of all glass relative to bedding, and face putting.
- B. Glazing compound shall be applied at normal working temperatures, providing surfaces are clean and dry. They shall adhere tightly to metal and glass and shall be delivered to the site with the manufacturer's containers and shall be used without adulteration. Compound shall not be applied in damp or rainy weather. Compound shall be finished in true, even lines and all surplus shall be removed from the glass.
- C. Protection:
 - 1. All glass shall be set in such a manner as to avoid breakage.

2. All glass broken due to faulty setting shall be replaced. All glass shall be protected from damage until final acceptance. Broken and defective or imperfect glass shall be removed and replaced by glass meeting specifications.
3. All glass and glazing materials shall be stored in a clean, secure and dry place off the floor and away from moisture and sources of dirt and soil.

D. Clean-up:

1. At completion all dirt stains, excess putty, etc., shall be removed and all glass shall be left clean. All glass that cannot be cleaned properly shall be removed and replaced by glass meeting specifications at no extra cost to the City.

3.2 CERTIFICATES:

3 copies of manufacturer's certificates for all glass will be required.

3.3 GUARANTEE:

- A. Guarantee in writing of materials and workmanship for a period of one year from the date of substantial completion of the entire project. Should defects occur within this time, promptly make necessary repairs or replacements at not cost to the Owner.
- B. Insulated glass shall be guaranteed in writing for a period of ten (10) years not to develop under normal conditions, material obstruction of vision, as a result of dirt or film formation on the internal glass surfaces caused by failure of the hermetic seal other than through glass breakage.

---END OF SECTION---

Section 09201

PLASTERING & STUCCO

Part One: General

1.01 GENERAL PROVISIONS

The provisions of Section 1 shall apply to all work of this Section.

1.02 SCOPE

Furnish all labor, materials, tools, equipment necessary or required for the work of this Section, as indicated on the drawings, herein specified, and as required by the existing conditions for proper performance and completion. Items of work shall consist generally of, but not be limited to, the following:

1.03 WORK INCLUDED

- a. All new plastering and cement stucco work.
- b. Patching and pointing of plastered surfaces after all work of other trades that abut or penetrate surfaces has been installed. Patching of all damaged plaster throughout the buildings that is to remain.
- c. Properly curing, protection and cleaning plaster work as hereinafter specified.

1.04 FIRE RESISTANCE REQUIREMENTS

Comply with fire-resistance ratings as shown and as required by CID, governing authorities and/or Pueblo of Santa Ana, State of New Mexico Building Codes. Provide materials and application procedures which have been tested and listed by UL for type of construction shown.

Part Two: Products

2.01 MATERIALS

- a. Plaster and stucco system shall be by a single manufacturer, Sto Stucco or approved equal.
- b. Sand shall be clean and sharp, entirely free from loam, salts, clay, and other impurities, thoroughly screened and washed, conforming to ASTM-C 35.
- c. Quicklimes shall be an approved brand conforming to ASTM-C 5.

- d. Hydrated lime shall be an approved brand conforming to ASTM-C6.
- e. Lime putty shall be a stiff mixture of pulverized quicklime or hydrated lime. Note: slake quicklime at job and allow to soak at least 48 hours. Soak hydrated lime at least 24 hours. No soaking required for pressure hydrated lime which shall be hydrated to at least 92 percent hydration. Keep lime putty moist until used and screen through a No. 10 sieve before using.
- f. Water shall be clean, fresh, and free from all deleterious substances.
- g. Cement for cement plaster shall be Saylor's Buff Colored Portland cement or by Bonsal, conforming to ASTM-C 150, Type I or III.
- h. Vermiculite plaster shall be "Zonolite Brand Vermiculite" as produced by the Zonolite Co.
- i. Gypsum plaster to be as manufactured by U.S. Gypsum Company or equal.
- j. Metal lath shall be expanded metal diamond mesh weighing not less than 3.4 lbs. per square yard, galvanized or dipped in asphaltum paint after fabrication. All lath for exterior use shall be galvanized.
- k. Casing beads shall be U.S. Gypsum Co., square style No. 66 not lighter than 24 gauge, of the expanded flange type, and shall be galvanized after fabrication.
- l. Corner beads shall be U.S. Gypsum Co.'s "No 1-A Expanded Corner Bead", not lighter than 26 gauge, and shall be galvanized after fabrication.

2.01 APPROVAL AND STORAGE OF MATERIALS

- a. The Contractor shall obtain approval of all materials he proposes to use, and shall submit samples for approval, to the Architect.
- b. Materials shall be delivered in unbroken and unopened containers bearing the brand and maker's name, and shall be properly stored under cover to protect them from moisture.

Part Three: Execution

3.01 WORKMANSHIP

- a. General – All plastering work and all materials and labor in connection therewith shall be furnished and performed in compliance with the applicable standard specifications for plastering of the American Standards Association.

b. All plastering materials shall be proportioned, mixed, and applied in strict accordance with the manufacturer's instructions and without the admixture of other materials.

c. Each coat of plaster shall be allowed to dry before application of succeeding coat.

d. Scratch coat shall be sufficiently thick to thoroughly cover all lath; shall be forced through lath to form an absolute key, and shall be well scratched.

e. Screed and true up the brown coats with long straight edges, float, smooth, and run to true lines.

f. Finished surfaces shall be straight and level.

g. Cement plaster stucco shall be three-coat work to a total minimum thickness of 1" unless otherwise indicated. Each coat shall consist of 1 part cement, 1/4 part lime and 3 to 5 parts sand, by volume. Scratch and brown coat shall be cured for 48 hours each. Finish coat shall be applied to a thickness of approximately 1/8"; rubber floated to a true and even surface, and then given a uniform sand texture or other approved finish. Dry-cure finish coat at least 6 days and protect against drying too rapidly to prevent shrinkage cracks and other defects.

h. Cleaning – Care shall be exercised to avoid soiling or spattering means of protection. Should soiling or spattering occur, it shall be removed by sponging brush cleaning, and as otherwise required before the plaster sets, in a manner to avoid scratching staining or other damage.

i. Metal lath shall be secured to furring with double looped 18 gauge galvanized steel wire or 16 gauge wire single looped not more than 6" apart along the furring. Lath shall be lapped at joints at least 3" and tied together at not over 4-1/2" intervals.

j. Casing beads and corner beads shall be accurately installed straight and securely fastened in place, generally as specified for lath.

3.02 SAMPLE PANELS

Provide three mock-up panels at job, dimensions 4'-0" x 4'-0". Follow Architect's instructions for desired texture and color of panels. Architect will select finish, texture and color from mock-up panels provided.

3.03 PATCHING AND PROTECTION

a. Repairing, pointing up, and patching of plastering shall be times as directed by the Architect. Point up around items abutting or extending through the plaster.

b. Finished plaster shall be protected at all times against damage, soiling and defacement.

3.04 GUARANTEE

a. Provide 5 year written guarantee of all workmanship and materials.

END OF SECTION 09201

SECTION 09250

GYPSUM DRYWALL SYSTEMS

PART 1 - GENERAL

- 1.1 **WORK INCLUDED:** Gypsum drywall and wood stud partitions and gypsum drywall work where so indicated on the Drawings.
- 1.2 **QUALIFICATIONS OF INSTALLERS:**
 - A. Use only skilled and experienced gypsum drywall installers for laying up the gypsum board, fastening, taping and finishing and veneer plaster application.
 - B. Helpers and apprentices used for such work shall be under full and constant supervision at all times by thoroughly skilled gypsum drywall installers.
 - C. In the acceptance or rejection of installed gypsum drywall, no allowance will be made for lack of skill on the part of the installers.
- 1.3 **MANUFACTURER'S RECOMMENDATIONS:** The manufacturer's recommended methods of installation, when approved by the Architect, shall be the basis for acceptance or rejection of actual installation methods used in this Work. All installation shall be in strict conformance with "Gypsum Construction Handbook" as published by the United States Gypsum Company.
- 1.4 **SUBMITTALS:**
 - A. **MATERIALS LIST:** Submit in accordance with the provisions of Section 01300 of these Specifications a complete list of all materials proposed to be furnished and installed under this portion of the Work, stating manufacturer's name and catalogue number for each item.
 - B. **MANUFACTURER'S RECOMMENDATIONS:** Accompanying the materials list, submit two copies of the manufacturer's current recommended method of installation of each item.
- 1.5 **PRODUCT HANDLING:**

- A. Protection: Use all means necessary to protect gypsum drywall materials before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 GENERAL: Materials shall be supplied in complete systems from one manufacturer to the extent practical. Acceptable manufacturer's are:

- A. United States Gypsum Co.
- B. Gold Bold Building Products, National Gypsum Division.
- C. Republic Gypsum Co.

2.2 INTERIOR GYPSUM WALL & CEILING BOARD SYSTEM:

- A. WALL BOARD: At all wall applications, install water-resistant, fire-rated Type "X" regular wall board conforming to the requirements of ASTM C-36-67. Tapered edge for finished surfaces and butt edge for concealed surfaces. Provide 5/8 " thick as called for on the drawings.
- B. CEILING BOARD: At all ceiling applications, install fire-rated Type "X" regular wall board conforming to the requirements of ASTM C-36-67. Tapered edge for finished surfaces and butt edge for concealed surfaces. Provide 1/2 " thick as called for on the drawings.
- C. JOINT SYSTEM:
 - 1. General: All joint system, including tape and compounds, shall be a system recommended by the manufacturer of the gypsum panels used as compatible with the gypsum panels and required finish applications.
 - 2. Components: A single compound may be used for embedment of tape, skim coating, and finishing if the compound is recommended for the purpose by the manufacturer of the gypsum panels used.

D. METAL WALL/PARTITION SUPPORT MATERIALS:

- 1. Non-loadbearing studs: Use ASTM C 645, galvanized steel, 25-gauge, 3-5/8" deep unless otherwise indicated. Use 20 gauge at door jambs and for support of restroom fixtures.

- 2. Furring members: Use ASTM C 645, galvanized steel, 25-gauge, hat-shaped.
- E. TRIM: All metal corner bead and edge trim, and all other accessory items, shall be a system recommended by the manufacturer of the gypsum panels used, as being compatible with the gypsum panels.
- 2.3 FINISH: Finish on all interior gypsum board is to be light and finish.
- 2.4 FASTENERS: All fasteners shall be metal screws especially designed for application of gypsum panels to metal studs and shall be the length and pattern recommended by the manufacturer of the gypsum panels used.
- 2.5 WATER: All water used in joint system shall be clean, fresh, and free from deleterious amount of foreign material.
- 2.6 SEALANT: Sealant for bottom runners shall be USG Acoustical Sealant.
- 2.7 OTHER MATERIALS: All other materials, not specifically described but required for a complete and proper installation of gypsum drywall systems, shall be as selected by the Contractor subject to approval of the Architect.

PART 3 – EXECUTION

- 3.1 INSPECTION:
 - A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
 - B. Verify that gypsum drywall may be installed in accordance with the original design, all pertinent codes and regulations, and to manufacturer's recommendations as approved by the Architect.
- 3.2 DISCREPANCIES:
 - A. In the event of discrepancy, immediately notify the Architect.
 - B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- 3.3 INSTALLATION OF CEILING SUPPORT SYSTEMS: Install furring hat channels at 24" o.c. perpendicular to floor framing channels. Secure to channels using fasteners recommended by the manufacturer for this installation.

3.4 INSTALLATION OF METAL WALL/PARTITION SUPPORT SYSTEMS:

A. RUNNER TRACKS:

1. Install runner tracks at floors, ceiling and structural walls and columns where gypsum drywall stud system abuts other work except as otherwise indicated.
2. At interior insulated partitions and partition surrounding toilet rooms install floor tracks on tow ¼ “ diameter continuous beads of sealant.

B. Space studs and wall furrings at 16” o.c., except as otherwise indicated. Attach studs to top and bottom tracks by button punch or screws, except that studs located adjacent to doors, windows, partition intersections or ends and at corners shall be screwed to tracks.

C. Frame door openings with vertical studs securely attached by screws at each jamb either directly to frames or to jamb anchor clips on door frame; install runner track sections (for jack studs) at head and secure to jamb studs.

D. Frame openings other than door openings in same manner as required for door openings; and install framing below sills of openings to match framing required above door heads.

E. Install supplementary framing, runners, furring, blocking and bracing at openings and terminations in the work, and at locations required to support fixtures, equipment, services, heavy trim, furnishing and similar work which cannot be adequately supported directly on gypsum board alone.

3.5 INSTALLATION OF GYPSUM WALL AND CEILING PANELS:

A. GENERAL: Install all panels plumb, level, and with all joints on bearing.

B. CUTTING:

1. When cutting gypsum drywall is required, cut by scoring and breaking or by sawing, working from the face side.
2. When cutting by scoring, cut through the face paper and then snap the panel back away from the cut face; then break the back paper by snapping the gypsum board in the reverse direction or by cutting the back paper.
3. Smooth all cut ends and edges of panels as necessary to obtain a smooth joint.
4. For cut-outs in panels for pipes, fixtures, and other small openings, make holes and cut-outs by sawing or by such other method as will not fracture the core or tear the covering and with such accuracy that

plates, escutcheons, or trim will cover the edges. All cut-outs in fire rated and sound rated partitions shall provide a tight joint.

5. The use of “score-and-knockout” method will not be permitted

C. FASTENING:

1. Properly space all fasteners in careful accordance with the manufacturer’s recommendations and code requirements, with heads slightly below the surface for proper cementing, but without breaking the paper cover.
2. Loosely butt all joints to be taped; firmly butt all joints to be left untreated.

3.6 INSTALLING METAL TRIM AND ACCESSORIES:

A. GENERAL: The Drawings do not purport to show all metal trim required; generally, provide corner bead at all exterior corners, and J-molding at all exposed drywall terminations.

B. INSTALLATION:

1. Carefully inspect the Drawings and verify location of all metal trim required.
2. Install all trim in strict accordance with the manufacturer’s recommendations, paying particular attention to make all trim installation plumb, level, and true to line, with firm attachment to supporting members.

3.7 TAPING AND FINISHING:

A. FIRST COAT:

1. Spread compound evenly over all joints, using suitable tools designed for the purpose.
2. Fill all joints recesses and metal trim.
3. Center the reinforcing tape on the joint and press into the fresh compound wiping down with sufficient pressure to remove excess compound but leaving sufficient compound under the tape for proper bond.
4. Feather all edges and leave the surface free from blisters and tape wrinkles.
5. Apply compound to all fastener recesses, leaving flush with the adjacent surfaces.
6. Fold reinforcing tape along its centerline and apply to all interior angles, following the same procedure as for joints.

B. SECOND COAT:

1. Lightly sand the dry compound with fine sandpaper to remove all irregularities.
2. Apply a second coat of compound to all joints, feathering approximately three inches beyond edges of tape.
3. Apply second coat to all fastener recesses; allow to dry.

C. THIRD COAT:

1. Lightly sand the dry compound with fine sandpaper to remove all irregularities.
2. Apply final skim coat, feathering out approximately two inches beyond second coat.
3. Third coat all fastener recesses and metal trim, and all interior angles; allow to dry.

D. TEXTURE: Gypsum wallboard ceiling and walls shall receive a sprayed-on light sand texture.

- 3.8 CLEANING UP: Do not allow the accumulation of scraps and debris arising from the Work of this Section but maintain the premises in a neat and orderly condition at all times. In the event of spilling or splashing compound onto other surfaces, immediately remove the spilled or splashed material and all traces of the residue to the approval of the Architect.

---END---

SECTION 09300

Ceramic Tile

PART 1 - GENERAL

1.1 **GENERAL CONDITIONS:**

The provision of Division 1 shall apply to the work of this section.

1.2 **SCOPE:**

The work of this section consists of furnishing all labor, materials, equipment, and appliances necessary or required to perform and complete all interior tile work as shown on the Drawings, as specified herein, and as necessary for proper execution of all related work for the entire project.

- A. Provide ceramic floor and wall tile for all designated areas and rooms as indicated on the Drawing.

1.3 **WORK INCLUDED:**

- A. Furnish and install new ceramic and/or quarry tile flooring and wall covering in areas indicated on Drawings.
- B. Grouting.

1.4 **WORK OF OTHER SECTIONS:**

The following related items of work are specified to be provided under other sections of the Specifications.

- A. Demolition, Removal & Replacement Work
- B. Painting & Finishing
- C. Gypsum Drywall

1.5 **SAMPLES:**

Submit samples of floor and wall tiles for the owner and architect's approval.

PART II-PRODUCTS:

2.1 **MATERIALS:**

- A. Portland Cement: ASTM C-150, Type 1
- B. Dry Set Mortar: ANSI A-1188.1 factory mixed complying with Tile Council of America Specs.
- C. Sand: ASTM C-144.
- D. Water: Clean and potable.
- E. Adhesive Grout for Wall Tiles: Water resistant organic latex adhesive, solvent type as manufactured by L&M Surco Co., American Olean, Upco Co. or approved equal.

- F. Caulking Compound: “Pecora”, “Miniwax”, “Kuhls”, “Vulcatex” or “Sikaflex” or approved equal. It shall be white color, elastic, waterproof and non-corrosive.
- G. Wall tile shall be cushioned edge glazed tile of a size and color to be selected by the Owner and Architect from samples of available size and colors.

2.2 **GENERAL:**

- A. Cutting and Fitting: All work shall be accurately cut, fitted and set. Do all necessary cutting and drilling of the ceramic and/or quarry tile necessary for the work of other sections, including cutting for all plumbing pipes and fixture supports, new and existing.
- B. Installer must examine the substrates on which tile will be installed and shall not proceed with the work until any unsatisfactory conditions are corrected. Surfaces upon which tile materials are to be applied shall be in suitable condition to assure a satisfactory installation, as determined by the tile subcontractor, and subject to approval by the Architect.
- C. The finished flooring and walls shall be smooth and uniform, without objectionable areas predominating in light or dark color, and shall be free from blemish.
- D. Existing saddles shall be retained and left undamaged. If damaged shall be replaced to match at no extra cost to the Owner.

PART III – EXECUTION:

3.1 **SETTING:**

- A. Comply with ANSI A-108.1 through A-198.5 as applicable to the work; also comply with Tile Council of America, “Handbook for Ceramic, Glass, and Stone Tile Installation.”
- B. Lay out tile work. Center tile fields both directions in each space or on each wall area, and adjust to minimize tile cutting. Use uniform joint widths of 1/16” for ceramic tile.
- C. Wall Tile:
 - 1. Set wall tile on gypsum wallboard by the organic adhesive setting bed method. Set all wall tiles by the floating method, placing tiles in final position directly, without sliding.
 - 2. All interior angles shall be square and all external angles shall be made with integral bull-nose tile.
 - 3. Sealer shall be applied to raw edges of the water resistant gypsum wallboard that have been cut to fit required dimensions prior to application of surface primer.
 - 4. Tile shall be placed with horizontal full height starter course overlapping lip of bathtub with space left for caulking.
 - 5. Wait 24 hrs. minimum for solvent to evaporated and grout wall tile with white proprietary grout.

3.2 **ALLOWABLE TOLERANCES:**

Do not exceed 1/8" deviation in 10' run any direction or – 1/8" at any location.

3.3 **CLEANING AND PROTECTION:**

- A. All exposed surfaces of tile shall be thoroughly pointed and cleaned after setting, care being exercised to avoid damage to or spoilage of surrounding materials. Saddles shall be protected and kept clean.
- B. Any damaged material shall be replaced as directed.
- C. After cleaning, floor tile shall be protected with non-staining sawdust, which shall be removed when directed.

3.4 **ACCESSORIES:**

See Schedule on Drawings.

---END---

SECTION 09900

INTERIOR PAINTING

PART 1 - GENERAL

- 1.1 WORK INCLUDED: The type of material to be used and the number of coats to be applied are listed in the "Painting Schedule" in this Section of these Specifications. See also the Finish Schedule on the Drawings for location of paints and other related requirements.
- 1.2 RELATED WORK DESCRIBED ELSEWHERE:
 - A. Prefinishing: Shop priming and factory prefinished are required on some, but not all, of the items described in other Sections of these Specifications.
 - B. Caulking: Basic requirements for caulking are described in Section 07920.
- 1.3 DEFINITIONS: The true "Paint" as used herein, includes enamels, paints, sealers, fillers, emulsions. And other coatings whether used as prime, intermediate, or finish coats.
- 1.4 QUALIFICATIONS OF PAINTERS: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces; in the acceptance or rejection of installed paint, no allowance will be made for lack of skill on the part of painters.
- 1.5 CODES AND STANDARDS: In addition to complying with all pertinent codes and regulations, comply with "Standard (Type I)" as defined by the Painting and Decorating Contractors of America in their "Modern Guide to Paint Specifications".
- 1.6 MATERIALS LIST:
 - A. Submit a complete list of all materials proposed to be furnished and installed under this portion of the Work.
 - B. This shall in no way be construed as permitting substitution of materials for those specified or approved for the Work by the Architect.
- 1.7 MANUFACTURER'S RECOMMENDATIONS: Submit for the Architect's review the current recommended method of application published by the manufacturer of the proposed material.
- 1.8 DELIVERY: Deliver all paint materials to the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.

1.9 PROTECTION:

- A. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
- B. Use all means necessary to protect paint materials before, during, and after application and to protect the installed work and materials of all other trades.

1.10 REPLACEMENTS: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART 2 – PRODUCTS:

2.1 MANUFACTURER:

- A. All paint materials selected for coating systems for each type of surface shall be the product of a single manufacturer.
- B. Paint materials listed herein, unless otherwise designated in the “Painting Schedule”, are the products of Sherwin Williams Paint Co. and Minwax Paint and Stain Co. and require no further approval as to manufacturer’s catalog number.
- C. Equivalent products of Pittsburgh Paint Company, Hanley Paint Co., Benjamin Moore, Glidden Company, Pratt & Lambert Company, may be used subject to approval by the Architect of a materials list which shall be submitted for such purpose.

2.2 COMPATIBILITY:

- A. All paint materials and equipment shall be compatible in use: finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating to be applied.
- B. Thinners, when used, shall be only thinners recommended for that purpose by the manufacturer of the material to be thinned.

PART 3 – EXECUTION:

3.1 INSPECTION:

- A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

- B. Verify that paint finished may be applied in strict accordance with all pertinent codes and regulations and the requirements of these Specifications
- C. Notify General Contractor to correct all surfaces which are not in proper condition to receive this Work. The beginning of painting constitutes that the surface is in an acceptable condition and any necessary corrections will be at the expense of the painter.

3.2 DISCREPANCIES:

- A. In the event of discrepancy, immediately notify the Architect.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 PREPERATION OF SURFACES, WOOD AND GENERAL:

- A. Protection: Prior to all surface preparations and paint operations, completely, mask, remove, or otherwise adequately protect all hardware, accessories, machines, surfaces, plates, lighting fixtures, and similar items in contact with painted surfaces but not scheduled to receive paint.
- B. Priming: Prime all surfaces with the specified primer before finish painting. Spot prime all exposed nails and other metals which are to be painted with emulsions paints, using a primer recommended by the manufacturer of the coating system.
- C. Cleaning:
 - 1. Before applying primer, paint, stain or other surface treatment, thoroughly clean all surfaces involved.
 - 2. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

3.4 PREPARATION OF METAL SURFACES:

- A. Galvanized Metal:
 - 1. Clean all surfaces thoroughly with solvent until they are completely free from dirt, oil and grease.
 - 2. Thoroughly treat the cleaned surface with phosphoric acid etch.
 - 3. Remove all excess etching solutions and allow to dry completely before application of paint.
- B. Other Metals:

1. Thoroughly clean all surfaces until they are completely free from dirt, oil, and grease.
 2. Allow to dry thoroughly before application of paint.
- C. Wood:
1. Thoroughly clean and lightly sand all wood surfaces to be stained.
 2. Allow to dry thoroughly before application of stain.

3.5 PAINT APPLICATION:

A. General:

1. Prepare sample color 2'-0" x 2'-0" areas of paint colors for prior approval by Owner and Architect before proceeding with painting.
2. Thoroughly clean off all existing flaking and chipping paint with a wire brush prior to painting.
3. Paint all surfaces, (except glass, aluminum, and similar items), not prefinished and not called out as unfinished.
4. Paint all grilles and other prefinished items where the factory prefinish is not in accordance with the Painting Schedule and color selection.

B. Drying:

1. Allow sufficient drying time between coats.
2. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.
3. Oil-base and oil-resinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Environmental Conditions.

1. Comply with the manufacturer's recommendations as to environmental conditions under which the coating systems may be applied.
2. Do not apply paint in areas where dust is being generated.
3. Spray applications will not be permitted unless on-the-job demonstration verifies spray applications and as approved by the Architect.

D. Moisture Content:

1. Use a moisture-meter to test surfaces.
2. Do not apply the initial coating until moisture-meter reading is within limits recommended by the paint materials manufacturer.

E. Defects: Sand and dust between coats to remove all defects visible to the unaided eye from a distance of five feet.

F. Color of Undercoats: Slightly vary the color of succeeding coats.

G. Paint Application, all paint shall have clean, dry, and sieved sand added to the paint mixture for the final exterior coat for a textured finish to match existing.

3.6 INSPECTION:

A. General: Do not apply additional coats until completed coat has been inspected and approved by the Architect.

B. Number of Coats: Only inspected and approved coats of paint will be considered in determining the number of coats applied.

3.7 DRY MIL THICKNESS:

A. General: Apply all coatings to the dry mil thickness indicated in the "Painting Schedule" below.

B. Measurement: Provide and use a "Dry Film Thickness Gage" to prove the dry mil thickness of paint applied.

3.8 REINSTALLATION OF REMOVED ITEMS: Following completion of painting in each space, promptly reinstall all items removed for painting, using only workmen skilled in the particular trade.

3.9 COLORS: To be selected by Architect. See Drawing's Finish and Painting Schedule.

3.10 CLEANING UP:

A. General:

1. During progress of the Work, do not allow the accumulation of empty containers or other excess items except in areas specifically set aside for that purpose.
2. Prevent accidental spilling of paint materials and, in event of such spill, immediately remove all spilled material and the waste or other equipment used to clean up the spill, and wash the surfaces to their original undamaged condition, all at no additional cost to the Owner.

B. Prior to Final Inspection: Upon completion of this portion of the Work, visually inspect all surfaces and remove all paint and traces of paint from surfaces not scheduled to be painted.

3.11 SPECIFICATION PAINTING SCHEDULE: Apply the following finishes to the areas designated, including but not limited to the entire Building wall areas and walkway canopy. Remove all areas of rust on steel support members before painting:

3.12

Dry Mil Thickness

1. Interior Walls: 2.4

Remove oil and grease by solvent.

- 1 coat Sherwin Williams Preparation
- 1 coat Sherwin Williams Primer
- 2 coats Sherwin Williams Acrylic interior semi gloss latex enamel

Color: See Finish Schedule on Drawings

2. Interior Wood:

Remove oil and grease by solvent.

- 2 coats Minwax wood stain

Color: Limed Oak white, or approved equal

---END OF SECTION---

SECTION 09901

EXTERIOR PAINTS AND COATINGS

PART 1 - GENERAL

- 1.1 **WORK INCLUDED:** The type of material to be used and the number of coats to be applied are listed in the "Painting Schedule" in this Section of these Specifications.
- 1.2 **RELATED WORK DESCRIBED ELSEWHERE:**
- A. Prefinishing: Shop priming and factory prefinished are required on some, but not all, of the items described in other Sections of these Specifications.
 - B. Caulking: Basic requirements for caulking are described in Section 07920.
- 1.3 **DEFINITIONS:** The true "Paint" as used herein, includes enamels, paints, sealers, fillers, emulsions. And other coatings whether used as prime, intermediate, or finish coats.
- 1.4 **QUALIFICATIONS OF PAINTERS:** Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces; in the acceptance or rejection of installed paint, no allowance will be made for lack of skill on the part of painters.
- 1.5 **CODES AND STANDARDS:** In addition to complying with all pertinent codes and regulations, comply with "Standard (Type I)" as defined by the Painting and Decorating Contractors of America in their "Modern Guide to Paint Specifications".
- 1.6 **MATERIALS LIST:**
- A. Submit a complete list of all materials proposed to be furnished and installed under this portion of the Work.
 - B. This shall in no way be construed as permitting substitution of materials for those specified or approved for the Work by the Architect.
- 1.7 **MANUFACTURER'S RECOMMENDATIONS:** Submit for the Architect's review the current recommended method of application published by the manufacturer of the proposed material.
- 1.8 **DELIVERY:** Deliver all paint materials to the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.

1.9 **PROTECTION:**

- A. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
- B. Use all means necessary to protect paint materials before, during, and after application and to protect the installed work and materials of all other trades.

1.10 **REPLACEMENTS:** In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

PART II – PRODUCTS:

2.1 **MANUFACTURER:**

- A. All paint materials selected for coating systems for each type of surface shall be the product of a single manufacturer.
- B. Paint materials listed herein, unless otherwise designated in the “Painting Schedule”, are the products of Sherwin Williams or Rustoleum Paint Co., and require no further approval as to manufacturer’s catalog number.
- C. Equivalent products of Pittsburgh Paint Company, Hanley Paint Co., Benjamin Moore, Glidden Company, Pratt & Lambert Company, may be used subject to approval by the Architect of a materials list which shall be submitted for such purpose.
- D. Wood Stain products shall be of Minwax Stain Company or approved equal.

2.2 **COMPATIBILITY:**

- A. All paint materials and equipment shall be compatible in use: finish coats shall be compatible with prime coats; prime coats shall be compatible with the surface to be coated; all tools and equipment shall be compatible with the coating to be applied.
- B. Thinners, when used, shall be only thinners recommended for that purpose by the manufacturer of the material to be thinned.

PART III – EXECUTION:

3.1 **INSPECTION:**

- A. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- B. Verify that paint finished may be applied in strict accordance with all pertinent codes and regulations and the requirements of these Specifications
- C. Notify General Contractor to correct all surfaces which are not in proper condition to receive this Work. The beginning of painting constitutes that the surface is in an acceptable condition and any necessary corrections will be at the expense of the painter.

3.2 **DISCREPANCIES:**

- A. In the event of discrepancy, immediately notify the Architect.
- B. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.3 **PREPERATION OF SURFACES, GENERAL AND WOOD :**

- A. Protection: Prior to all surface preparations and paint operations, completely, mask, remove, or otherwise adequately protect all hardware, accessories, machines, surfaces, plates, lighting fixtures, and similar items in contact with painted stained surfaces but not scheduled to receive paint or stain.
- B. Priming: Spot prime all exposed nails and other metals which are to be painted with emulsions paints, using a primer recommended by the manufacturer of the coating system.
- C. Cleaning:
 - 1. Before applying paint or other surface treatment, thoroughly clean all surfaces involved.
 - 2. Schedule all cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

3.4 **PREPARATION OF METAL SURFACES:**

- A. Galvanized Metal:
 - 1. Clean all surfaces thoroughly with solvent until they are completely free from dirt, oil and grease.
 - 2. Thoroughly treat the cleaned surface with phosphoric acid etch.
 - 3. Remove all excess etching solutions and allow to dry completely before application of paint.

B. Other Metals:

1. Thoroughly clean all surfaces until they are completely free from dirt, oil, and grease.
2. Allow to dry thoroughly before application of paint.

3.5 **PAINT APPLICATION:**

A. General:

1. Paint all surfaces, (except glass, masonry, aluminum, and similar items), not prefinished and not called out as unfinished.
2. Paint all grilles and other prefinished items where the factory prefinish is not in accordance with the Painting Schedule and color selection.

B. Drying:

1. Allow sufficient drying time between coats.
2. Modify the period as recommended by the material manufacturer to suit adverse weather conditions.
3. Oil-base and oil-resinous solvent-type paints shall be considered dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Environmental Conditions.

1. Comply with the manufacturer's recommendations as to environmental conditions under which the coating systems may be applied.
2. Do not apply paint in areas where dust is being generated.
3. Spray applications will not be permitted unless on-the-job demonstration verifies spray applications and as approved by the Architect.

D. Moisture Content:

1. Use a moisture-meter to test surfaces.
2. Do not apply the initial coating until moisture-meter reading is within limits recommended by the paint materials manufacturer.

E. Defects: Sand and dust between coats to remove all defects visible to the unaided eye from a distance of five feet.

F. Color of Undercoats: Slightly vary the color of succeeding coats.

3.6 **INSPECTION:**

A. General: Do not apply additional coats until completed coat has been inspected and approved by the Architect.

B. Number of Coats: Only inspected and approved coats of paint will be considered in determining the number of coats applied.

3.7 **DRY MIL THICKNESS:**

A. General: Apply all coatings to the dry mil thickness indicated in the “Painting Schedule”.

B. Measurement: Provide and use a “Dry Film Thickness Gage” to prove the dry mil thickness of paint applied.

3.8 **REINSTALLATION OF REMOVED ITEMS:** Following completion of painting in each space, promptly reinstall all items removed for painting, using only workmen skilled in the particular trade.

3.9 **COLORS:** To be selected by Architect: one (1) exterior color, for all roof top equipment and piping.

3.10 **CLEANING UP:**

A. General:

1. During progress of the Work, do not allow the accumulation of empty containers or other excess items except in areas specifically set aside for that purpose.
2. Prevent accidental spilling of paint materials and, in event of such spill, immediately remove all spilled material and the waste or other equipment used to clean up the spill, and wash the surfaces to their original undamaged condition, all at no additional cost to the Owner.

B. Prior to Final Inspection: Upon completion of this portion of the Work, visually inspect all surfaces and remove all paint and traces of paint from surfaces not scheduled to be painted.

3.11 **PAINTING SCHEDULE:** Apply the following finishes to the areas designated, including but not limited to the entire Roof Top Area and the Entrance Canopy and West Soffit ceiling and soffit areas. Remove all areas of rust on steel support members before painting:

3.12

A. Exterior Work:

Dry Mil Thickness

1. Exterior Galvanized Metal: 2.4
Include all exposed steel beams, capitals and columns, ducts, pipes & vents on roof.
Remove oil and grease by solvent.

1 coat Rustoleum V2100 System Enamel Primer

2 coats Rustoleum V2100 System Enamel

Color: Tan

2. Exterior Metal: 2.4

Includes all factory finished roof mounted equipment (except aluminum), frames, ladders, and miscellaneous ferrous metals on the exterior of the building.

1 coat Rustoleum V2100 System Enamel Primer

2 coats Rustoleum V2100 System Enamel

Color: Tan

3. Exterior Wood: 2.4

Includes all wood beams, posts, frames and miscellaneous wood on the exterior of the building.

2 coats Minwax Stain

Color: Natural

---END OF SECTION--

SECTION 10001 CABINETRY

1.01 GENERAL CONDITIONS

The provisions of Division 1 shall apply to the work of this section.

All materials labor equipment and accessories required for the complete installation of all Cabinetry and all other related work of this section including but not limited to the following:

- a. Furnishing and installation of kitchen cabinetry as shown on the drawings
- b. All other cabinetry, counter top work, installation of sinks, shelving, casework as shown on the drawings.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

Work related to work specified in this section includes but is not limited to the following.

- A. Finished Carpentry: Section 06200
- B. Plumbing and Electrical work Sections

1.03 QUALITY ASSURANCE:

A. Code: Except as otherwise shown, all carpentry work is to be performed in accordance with the applicable provisions of the New Mexico Building Code, latest edition.

B. Workmanship: All work shall be done by personnel well qualified in the trade and shall be erected plumb, true and square, joined accurately and fitted to suit requirements of the work.

C. Grading Standards: Dimension lumber shall be graded in accordance with Voluntary Product Standard PSI and the standard grading rules of one of the following agencies:

- 1. West Coast Lumber Inspection Bureau;
- 2. Western Wood Products Association.

D. SUBMITTALS

Furnish and supply complete shop drawings of all cabinetry and related items indicating their dimensions, construction and materials. Submit samples of all materials and hardware to be used and their colors for approval.

1.04 JOB CONDITIONS:

A. Cooperate with other contractors and provide grounds, stripping, nailing bucks, blocking, and other wood construction as required to properly secure all materials, equipment, etc.

B. Read specifications complete, and accomplish any work therein specified which will require work by carpenters and is usually considered as such.

C. Performed work under this section with particular reference to timing and conduct of operations and in cooperating to facilitate work of other trades.

PART 2 PRODUCTS

2.01 GENERAL:

Provide all materials as shown on drawings and/or as required for the successful execution of the work, whether specifically noted or not. Size as required to provide a minimum of joints.

A. Manufacturer: All cabinetry shall be as manufactured by:

1. KraftMaid Cabinets, solid wood, Maple finish, as distributed by Lowes
or an approved equal quality manufacturer with at least 10 years prior experience with projects of this nature.

B. Plywood: Type, grade, thickness and identification index as shown on the drawings with APA grade-trademark on each piece. Fabricated in accordance with Voluntary Product Standard PS 1-74, "Construction and Industrial Plywood".

C. Cabinets shall be fully dowelled and glued construction of solid # one pine wood construction. Doors and drawers shall be of panel construction and shall have hidden hinge and glide ball bearing track systems. Pulls shall be hand forged black iron pulls. Cabinets shall have toe kick or ADA accessible areas at sinks or designated ADA areas as per the drawings

D. Countertops shall be polished and filled travertine stone 1 & 1/2 inch thick, as provided by NM Travertine Co. or approved equal. S

E. Fastening Devices: Bolts, nuts, washers, nails, shields, screws, spikes, etc. as required.

PART 3: EXECUTION

3.01 TEMPORARY ENCLOSURES:

A. Provide temporary closures at all openings where so required to protect the work.

3.02 PROTECTIVE BARRIERS AND COVERS:

A. Provide approved temporary wood railings or barricades.
in accordance with requirements of Section 01500, Temporary Facilities.

3.03 GROUNDS, NAILERS, CURBS AND SCREEDS:

A. Grounds and nailers: Provide Mill dressed grounds and nailers properly set and secured to rough construction wherever required as base for attachment of equipment, accessories or finish Materials, and wherever grounds are required for proper application of finishes.
B. Curbs and screeds: Provide curbs and screeds under roof mounted equipment as shown on drawings or as required for a complete and proper installation. Run screeds continuous to next joist beyond equipment.

3.04 CABINETRY INSTALLATION

A. Install all cabinetry in a thorough and workmanlike manner to achieve a complete installation according to the drawings. Provide all materials and labor necessary for a plumb and level installation. Coordinate with all related trades and work.

3.05 ADJUST AND CLEAN:

A. Thoroughly inspect all installed systems and/or materials.

B. Remove and replace all defective work. Remove all temporary installations to leave no trace. Remove all debris resulting from operations and leave area and surfaces broom clean, ready for other trades.

3.07 GUARANTEE

A. Guarantee the work and materials of this section for a period of one year from the date of substantial completion.

END OF SECTION

SECTION 22 4000
PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sinks.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Manufacturer's Instructions: Indicate installation methods and procedures.
- D. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- E. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.04 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Potable Water Systems: Provide plumbing fittings and faucets that comply with NSF 61 and NSF 372 for maximum lead content; label pipe and fittings.
- B. See plumbing plans for fixtures.

2.02 REGULATORY REQUIREMENTS

- A. Comply with applicable codes for installation of plumbing systems.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 PREPARATION

- A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Provide chrome plated rigid or flexible supplies to fixtures with loose key stops, reducers, and escutcheons.
- C. Install components level and plumb.
- D. Install and secure fixtures in place with wall supports and bolts.

3.04 INTERFACE WITH WORK OF OTHER SECTIONS

- A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.05 ADJUSTING

- A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

- A. Clean plumbing fixtures and equipment.

3.07 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Do not permit use of fixtures by construction personnel.
- C. Repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Adhesive-backed duct markers.
- C. Pipe markers.
- D. Ceiling tacks.

1.02 REFERENCE STANDARDS

- A. ASTM D709 - Standard Specification for Laminated Thermosetting Materials; 2017.

PART 2 PRODUCTS

2.01 IDENTIFICATION APPLICATIONS

- A. Air Handling Units: Nameplates.
- B. Ductwork: Nameplates.
- C. Thermostats: Nameplates.

2.02 NAMEPLATES

- A. Letter Color: White.
- B. Letter Height: 1/4 inch.
- C. Background Color: Black.
- D. Plastic: Comply with ASTM D709.

2.03 ADHESIVE-BACKED DUCT MARKERS

- A. Material: High gloss acrylic adhesive-backed vinyl film 0.0032 inch; printed with UV and chemical resistant inks.
- B. Style: Individual Label.
- C. Color: Yellow/Black.

2.04 PIPE MARKERS

- A. Color: Comply with ASME A13.1.
- B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure-sensitive adhesive backing and printed markings.

2.05 CEILING TACKS

- A. Description: Steel with 3/4 inch diameter color coded head.
- B. Color code as follows:
 - 1. HVAC Equipment: Yellow.

PART 3 EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.

3.02 INSTALLATION

- A. Install nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install plastic pipe markers in accordance with manufacturer's instructions.
- C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

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IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

- D. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.
- E. Install ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.
- F. Locate ceiling tacks to locate valves or dampers above lay-in panel ceilings. Locate in corner of panel closest to equipment.

END OF SECTION

TESTING, ADJUSTING, AND BALANCING FOR HVAC

SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Commissioning activities.

1.02 REFERENCE STANDARDS

- A. AABC (NSTSB) - AABC National Standards for Total System Balance, 7th Edition; 2016.
- B. ASHRAE Std 111 - Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems; 2008, with Errata (2019).
- C. NEBB (TAB) - Procedural Standard for Testing Adjusting and Balancing of Environmental Systems; 2019.
- D. SMACNA (TAB) - HVAC Systems Testing, Adjusting and Balancing; 2002.

1.03 SUBMITTALS

- A. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
 - 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
 - 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.
 - 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
 - 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
 - 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
 - 6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.
 - i. Project altitude.
 - j. Report date.
- B. Project Record Documents: Record actual locations of flow measuring stations and balancing valves and rough setting.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 - 1. ASHRAE Std 111, Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.

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TESTING, ADJUSTING, AND BALANCING FOR HVAC

2. SMACNA (TAB).
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. TAB Agency Qualifications:
 1. Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 2. Having minimum of three years documented experience.
- D. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 1. Systems are started and operating in a safe and normal condition.
 2. Temperature control systems are installed complete and operable.
 3. Proper thermal overload protection is in place for electrical equipment.
 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 5. Fans are rotating correctly.
 6. Air coil fins are cleaned and combed.
 7. Access doors are closed and duct end caps are in place.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
- C. Beginning of work means acceptance of existing conditions.

3.03 AIR SYSTEM PROCEDURE

- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities at site altitude.
- B. Measure air quantities at air inlets and outlets.
- C. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.

3.04 COMMISSIONING

- A. Perform prerequisites prior to starting commissioning activities.
- B. Fill out Prefunctional Checklists for:
 1. Air side systems.
- C. Furnish to the Commissioning Authority, upon request, any data gathered but not shown in the final TAB report.
- D. Re-check a random sample equivalent to 5 percent of the final TAB report data as directed by Commissioning Authority.
 1. Original TAB agency shall execute the re-checks, witnessed by the Commissioning Authority.
 2. Use the same test instruments as used in the original TAB work.
 3. Failure of more than 10 percent of the re-checked items of a given system shall result in the rejection of the system TAB report; rebalance the system, provide a new system TAB report, and repeat random re-checks.

TESTING, ADJUSTING, AND BALANCING FOR HVAC

4. For purposes of re-check, failure is defined as follows:
 - a. Air Flow of Supply and Return: Deviation of more than 10 percent of instrument reading.
 - b. Temperatures: Deviation of more than one degree F.
 - c. Air and Water Pressures: Deviation of more than 10 percent of full scale of test instrument reading.
 - d. Sound Pressures: Deviation of more than 3 decibels, with consideration for variations in background noise.
 5. For purposes of re-check, a whole system is defined as one in which inaccuracies will have little or no impact on connected systems; for example, the air distribution system served by one air handler or the hydronic chilled water supply system served by a chiller or the condenser water system.
- E. In the presence of the Commissioning Authority, verify that:
1. Final settings of all valves, splitters, dampers and other adjustment devices have been permanently marked.
 2. The air system is being controlled to the lowest possible static pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from fan to diffuser having all balancing dampers wide open and that during full cooling of all terminal units taking off downstream of the static pressure sensor, the terminal unit on the critical leg has its damper 90 percent or more open.
 3. The water system is being controlled to the lowest possible pressure while still meeting design loads, less diversity; this shall include a review of TAB methods, established control setpoints, and physical verification of at least one leg from the pump to the coil having all balancing valves wide open and that during full cooling the cooling coil valve of that leg is 90 percent or more open.

3.05 SCOPE

- A. Test, adjust, and balance the following:
1. Air Cooled Refrigerant Condensers.
 2. Packaged Terminal Air Conditioning Units.
 3. Air Handling Units.
 4. Fans.
 5. Air Inlets and Outlets.

3.06 MINIMUM DATA TO BE REPORTED

- A. Electric Motors:
1. Manufacturer.
 2. Model/Frame.
 3. HP/BHP.
 4. Phase, voltage, amperage; nameplate, actual, no load.
 5. RPM.
- B. Air Cooled Condensers:
1. Identification/number.
 2. Location.

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TESTING, ADJUSTING, AND BALANCING FOR HVAC

3. Manufacturer.
4. Model number.
5. Serial number.
6. Entering DB air temperature, design and actual.
7. Leaving DB air temperature, design and actual.
- C. Cooling Coils:
 1. Location.
 2. Service.
 3. Air flow, design and actual.
 4. Entering air DB temperature, design and actual.
 5. Entering air WB temperature, design and actual.
 6. Leaving air DB temperature, design and actual.
 7. Leaving air WB temperature, design and actual.
- D. Heating Coils:
 1. Location.
 2. Service.
 3. Air flow, design and actual.
 4. Entering air temperature, design and actual.
 5. Leaving air temperature, design and actual.
- E. Air Moving Equipment:
 1. Location.
 2. Manufacturer.
 3. Model number.
 4. Serial number.
 5. Air flow, specified and actual.
 6. Return air flow, specified and actual.
 7. Outside air flow, specified and actual.
 8. Total static pressure (total external), specified and actual.
 9. Fan RPM.
- F. Return Air/Outside Air:
 1. Identification/location.
 2. Design air flow.
 3. Actual air flow.
 4. Design return air flow.
 5. Actual return air flow.
 6. Design outside air flow.
 7. Actual outside air flow.
 8. Return air temperature.
 9. Outside air temperature.
- G. Air Distribution Tests:
 1. Air terminal number.
 2. Room number/location.
 3. Terminal type.

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4. Terminal size.
5. Area factor.
6. Design velocity.
7. Design air flow.
8. Test (final) velocity.
9. Test (final) air flow.
10. Percent of design air flow.

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Duct insulation.
- B. Jacketing and accessories.

1.02 REFERENCE STANDARDS

- A. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.
- B. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2021.
- C. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013 (Reapproved 2019).
- D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- F. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- G. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, documented experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

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DUCT INSULATION

2.02 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
 - 1. Johns Manville: www.jm.com/#sle.
 - 2. Knauf Insulation: www.knaufinsulation.com/#sle.
- B. Insulation: ASTM C553; flexible, noncombustible blanket.
 - 1. 'K' value: 0.26 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Maximum Service Temperature: 450 degrees F.
- C. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2.03 GLASS FIBER, RIGID

- A. Insulation: ASTM C612; rigid, noncombustible blanket.
 - 1. K Value: 0.24 at 75 degrees F, when tested in accordance with ASTM C518.
 - 2. Maximum Service Temperature: 450 degrees F.
 - 3. Maximum Water Vapor Absorption: 5.0 percent.
 - 4. Maximum Density: 8.0 pcf.
- B. Vapor Barrier Jacket:
 - 1. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E96/E96M.

2.04 JACKETING AND ACCESSORIES

- A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire-retardant lagging adhesive.
 - 1. Lagging Adhesive:
 - a. Compatible with insulation.
- B. Aluminum Jacket:
 - 1. Comply with ASTM B209/B209M, Temper H14, minimum thickness of 0.016 inch with factory-applied polyethylene and kraft paper moisture barrier on the inside surface.
 - 2. Thickness: 0.016 inch sheet.
 - 3. Finish: Smooth.
 - 4. Joining: Longitudinal slip joints and 2 inch laps.
 - 5. Fittings: 0.016 inch thick die-shaped fitting covers with factory-attached protective liner.
 - 6. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Test ductwork for design pressure prior to applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated Ducts Conveying Air Below Ambient Temperature:
 - 1. Provide insulation with vapor barrier jackets.
 - 2. Finish with tape and vapor barrier jacket.
 - 3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.

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DUCT INSULATION

4. Insulate entire system, including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.
- D. Insulated Ducts Conveying Air Above Ambient Temperature:
 1. Provide with or without standard vapor barrier jacket.
 2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
- E. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with caulked aluminum jacket with seams located on bottom side of horizontal duct section.
- F. External Duct Insulation Application:
 1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
 2. Secure insulation without vapor barrier with staples, tape, or wires.
 3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
 5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

3.03 SCHEDULES

- A. Outside Air Intake Ducts: Per IECC.
- B. Supply Ducts: Per IECC.
- C. Return Ducts: Per IECC.

END OF SECTION

SECTION 23 07 19
HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping insulation.
- B. Flexible removable and reusable blanket insulation.
- C. Weather barrier coatings.
- D. Jacketing and accessories.
- E. Engineered wall outlet seals and refrigerant piping insulation protection.

1.02 REFERENCE STANDARDS

- A. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus; 2019.
- B. ASTM C534/C534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form; 2023.
- C. ASTM C795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel; 2008 (Reapproved 2023).
- D. ASTM D610 - Standard Practice for Evaluating Degree of Rusting on Painted Steel Surfaces; 2008 (Reapproved 2019).
- E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- F. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2023.
- G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).
- H. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).
- I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

1.06 FIELD CONDITIONS

- A. Maintain ambient conditions required by manufacturers of each product.
- B. Maintain temperature before, during, and after installation for minimum of 24 hours.

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HVAC PIPING INSULATION

PART 2 PRODUCTS

2.01 REGULATORY REQUIREMENTS

- A. Surface Burning Characteristics: Flame spread index/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84 or UL 723.

2.02 FLEXIBLE ELASTOMERIC CELLULAR INSULATION

- A. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C534/C534M Grade 1; use molded tubular material wherever possible.
 - 1. Minimum Service Temperature: Minus 40 degrees F.
 - 2. Maximum Service Temperature: 180 degrees F.
 - 3. Connection: Waterproof vapor barrier adhesive.
- B. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.
- C. Weather Barrier Coating: Air dried, contact adhesive, compatible with insulation and ASTM E84 compliant.

2.03 WEATHER BARRIER COATINGS

- A. Weather-Resistive Barrier Coating: Fire-resistive, UV resistant, water-based mastic for use over closed cell polyethylene and polyurethane foam insulation; applied with glass fiber or synthetic reinforcing mesh.
 - 1. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, Class A, when tested in accordance with ASTM E84.
 - 2. Water Vapor Permeance: Greater than 1.0 perm in accordance with ASTM E96/E96M.

2.04 JACKETING AND ACCESSORIES

- A. PVC Plastic.
 - 1. Jacket: One piece molded type fitting covers and sheet material, off-white color.
 - a. Minimum Service Temperature: 0 degrees F.
 - b. Maximum Service Temperature: 150 degrees F.
 - c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E96/E96M.
 - d. Thickness: 10 mil, 0.010 inch.
 - e. Connections: Brush on welding adhesive.
 - 2. Covering Adhesive Mastic: Compatible with insulation.

2.05 ENGINEERED WALL OUTLET SEALS AND REFRIGERANT PIPING INSULATION PROTECTION

- A. Pipe Penetration Wall Seal: Seals HVAC piping wall penetrations with compression gasket wall mounted rigid plastic outlet cover.
 - 1. Wall Outlet Size, Stucco and Masonry Applications: 7-1/2 inch wide by 10 inch high.
 - a. Elastomeric Sleeve Diameter: 1-11/16 inch.
 - 2. Outlet Cover Color: Gray.
 - 3. Water Penetration: Comply with ASTM E331.
 - 4. Air Leakage: Comply with ASTM E283.
- B. Insulation Protection System: Refrigerant piping insulation PVC protective cover.
 - 1. PVC Insulation Cover Color: Black with full-length velcro fastener.
 - 2. Flame Spread and Smoke Development Rating of 24/450: Comply with ASTM E84 or UL 723.

2.06 ACCESSORIES

- A. General Requirements:

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HVAC PIPING INSULATION

1. Provide required accessories in accordance with and subject to the recommendations of the insulation manufacturer.
 2. Furnish compatible materials which do not contribute to corrosion, soften, or otherwise attack surfaces to which applied, in either the wet or dry state.
 3. Comply with ASTM C795 requirements for materials to be used on stainless steel surfaces.
 4. Supply materials that are asbestos free.
- B. Corrosion Inhibitors:
1. Corrosion Control Gel:
 - a. Corrosion Protection: Comply with ASTM B117 and ASTM D610.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Test piping for design pressure, liquid tightness, and continuity prior to applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Exposed Piping: Locate insulation and cover seams in least visible locations.
- D. Insulated Pipes Conveying Fluids Below Ambient Temperature:
 1. Insulate entire system, including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- E. For hot piping conveying fluids over 140 degrees F, insulate flanges and unions at equipment.
- F. Glass Fiber Insulated Pipes Conveying Fluids Above Ambient Temperature:
 1. Provide standard jackets, with or without vapor barrier, factory-applied, or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure-sensitive adhesive. Secure with outward clinch expanding staples.
 2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
- G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.
- H. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with PVC jacket with seams located on bottom side of horizontal piping. Provide two coats of UV resistant finish for flexible elastomeric cellular insulation without jacketing.

3.03 SCHEDULE

- A. Heating Systems: Per IECC
- B. Cooling Systems: Per IECC

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Piping.
- B. Refrigerant.
- C. Moisture and liquid indicators.
- D. Valves.
- E. Strainers.
- F. Filter-driers.
- G. Flexible connections.
- H. Exterior penetration accessories.

1.02 REFERENCE STANDARDS

- A. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; 2022, with Addendum (2024).
- B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.
- C. ASME B31.5 - Refrigeration Piping and Heat Transfer Components; 2022.
- D. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service; 2023.
- E. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.
- F. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

1.03 SUBMITTALS

- A. Product Data: Provide general assembly of specialties, including manufacturer's catalogue information. Provide manufacturer's catalog data including load capacity.
- B. Shop Drawings: Indicate schematic layout of system, including equipment, pipe routing with dimensions, lengths, 90 deg. elbows, and sizes. This information is required for verification of system operation and therefore the system will not be approved without it.
- C. Installer's qualification statement.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store piping and specialties in shipping containers with labeling in place.
- B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.
- C. Dehydrate and charge components such as piping and receivers, seal prior to shipment, until connected into system.

PART 2 PRODUCTS

2.01 SYSTEM DESCRIPTION

- A. Where more than one piping system material is specified ensure system components are compatible and joined to ensure integrity of system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- B. Provide pipe hangers and supports in accordance with ASME B31.5 unless indicated otherwise.
- C. Flexible Connectors: Utilize at or near compressors where piping configuration does not absorb vibration.

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REFRIGERANT PIPING

2.02 REGULATORY REQUIREMENTS

- A. Products Requiring Electrical Connection: Listed and classified by UL, as suitable for the purpose indicated.

2.03 PIPING

- A. Copper Tube: ASTM B280, H58 hard drawn or O60 soft annealed.
 - 1. Fittings: ASME B16.22 wrought copper.
 - 2. Joints: Braze, AWS A5.8M/A5.8 BCuP silver/phosphorus/copper alloy.
- B. Pipe Supports and Anchors:
 - 1. Provide hangers and supports that comply with MSS SP-58.
 - a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
 - 2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
 - 3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
 - 4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
 - 5. Vertical Support: Steel riser clamp.
 - 6. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
 - 7. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
 - 8. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

2.04 REFRIGERANT

- A. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.

2.05 MOISTURE AND LIQUID INDICATORS

2.06 MOISTURE AND LIQUID INDICATORS

- A. Indicators: Single port type, UL listed, with copper or brass body, flared or soldered ends, sight glass, color coded paper moisture indicator with removable element cartridge and plastic cap; for maximum temperature of 200 degrees F and maximum working pressure of 500 psi.

2.07 FLEXIBLE CONNECTORS

- A. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure of 500 psi.

2.08 EXTERIOR PENETRATION ACCESSORIES

- A. Flashing Panels for Exterior Wall Penetrations: Premanufactured components and accessories as required to preserve integrity of building envelope; suitable for conduits and facade materials to be installed.

PART 3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain-end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

- A. Install refrigeration specialties in accordance with manufacturer's instructions.

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REFRIGERANT PIPING

- B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space and avoid interference with use of space.
- D. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- E. Inserts:
 - 1. Provide inserts for placement in concrete formwork.
 - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- F. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.5.
 - 2. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 3. Place hangers within 12 inches of each horizontal elbow.
- G. Flood piping system with nitrogen when brazing.
- H. Insulate piping.
- I. Follow ASHRAE Std 15 procedures for charging and purging of systems and for disposal of refrigerant.
- J. Install flexible connectors at right angles to axial movement of compressor, parallel to crankshaft.
- K. Fully charge completed system with refrigerant after testing.

3.03 FIELD QUALITY CONTROL

- A. Test refrigeration system in accordance with ASME B31.5.
- B. Pressure test system with dry nitrogen to 200 psi. Perform final tests at 27 inches vacuum and 200 psi using halide torch. Test and repair piping until no leakage.

3.04 SCHEDULES

- A. Hanger Spacing for Copper Tubing.
 - 1. 1/2 inch, 5/8 inch, and 7/8 inch OD: Maximum span, 5 feet; minimum rod size, 1/4 inch.
 - 2. 1-1/8 inch OD: Maximum span, 6 feet; minimum rod size, 1/4 inch.
 - 3. 1-3/8 inch OD: Maximum span, 7 feet; minimum rod size, 3/8 inch.
 - 4. 1-5/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.
 - 5. 2-1/8 inch OD: Maximum span, 8 feet; minimum rod size, 3/8 inch.

END OF SECTION

100% CONSTRUCTION DOCUMENTS
HVAC DUCTS AND CASINGS

SECTION 23 31 00
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal ducts.
- B. Flexible ducts.

1.02 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2023.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements; 2018, with Editorial Revision (2020).
- E. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry; 2018, with Editorial Revision (2020).
- F. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements; 2017, with Editorial Revision (2020).
- G. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements; 2023.
- H. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- I. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.
- J. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- K. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. Shop Drawings: Indicate duct fittings, particulars such as gages, sizes, welds, and configuration prior to start of work for all systems.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience, and approved by manufacturer.

1.05 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Provide UL Class 1 ductwork, fittings, hangers, supports, and appurtenances in accordance with NFPA 90A and SMACNA (DCS) guidelines unless stated otherwise.
- B. Provide metal duct unless otherwise indicated. Fibrous glass duct can be substituted at the Contractor's option.

HVAC DUCTS AND CASINGS

- C. Duct Shape and Material in accordance with Allowed Static Pressure Range:
 - 1. Round: Plus or minus 2 in-wc of galvanized steel.
 - 2. Rectangular: Plus or minus 1/2 in-wc of galvanized steel.
- D. Duct Sealing and Leakage in accordance with Static Pressure Class:
 - 1. Duct Pressure Class and Material for Common Mechanical Ventilation Applications:
 - a. Supply Air: 1/2 in-wc pressure class, galvanized steel.
 - b. Outside Air Intake: 1/2 in-wc pressure class, galvanized steel.
 - c. Return and Relief Air: 1/2 in-wc pressure class, galvanized steel.
 - d. General Exhaust Air: 1/2 in-wc pressure class, galvanized steel.
 - e. Heating or Combustion Air: 1/2 in-wc pressure class, galvanized steel.
- E. Duct Fabrication Requirements:
 - 1. Duct and Fitting Fabrication and Support: SMACNA (DCS) including specifics for continuously welded round and oval duct fittings.
 - 2. Use reinforced and sealed sheet-metal materials at recommended gauges for indicated operating pressures or pressure class.
 - 3. Construct tees, 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 must be used, provide airfoil turning vanes of perforated metal with glass fiber insulation.
 - 4. Provide turning vanes of perforated metal with glass fiber insulation when acoustical lining is indicated.
 - 5. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
 - 6. Provide turning vanes of perforated metal with glass fiber insulation when an acoustical lining is required.
 - 7. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.02 METAL DUCTS

2.03 METAL DUCTS

- A. Material Requirements:
 - 1. Galvanized Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M FS Type B, with G60/Z180 coating.
- B. Metal Duct Coating Requirements:
 - 1. Antimicrobial Coating: Factory- or field-applied in accordance with manufacturer's instructions.
- C. Round Spiral Duct:
 - 1. Round spiral lock seam duct with galvanized steel outer wall.
- D. Connectors, Fittings, Sealants, and Miscellaneous:
 - 1. Fittings: Manufacture with solid inner wall of perforated galvanized steel.
 - 2. Transverse Duct Connection System: SMACNA "E" rated rigid class connection, interlocking angle and duct edge connection system with sealant, gasket, cleats, and corner clips in accordance with SMACNA (DCS).

HVAC DUCTS AND CASINGS

3. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - a. Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - b. VOC Content: Not more than 250 g/L, excluding water.
 - c. Surface Burning Characteristics: Flame spread index of zero and smoke developed index of zero, when tested in accordance with ASTM E84.
 - d. For Use with Flexible Ducts: UL labeled.
4. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.
5. Hanger Fasteners: Attach hangers to structure using appropriate fasteners as follows:
 - a. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
 - b. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
 - c. Concrete Screw Type Anchors: Complying with ICC-ES AC193.
 - d. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
 - e. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.

2.04 FLEXIBLE DUCTS

- A. Flexible Air Ducts:
 1. UL 181, Class 1, multiple layers of aluminum laminate supported by helically wound spring steel wire.
 2. Pressure Rating: From 10 in-wc positive to 1 in-wc negative.
 3. Maximum Velocity: 4,000 fpm.
 4. Temperature Range: Minus 20 to 210 degrees F.
- B. Flexible Air Ducts:
 1. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire.
 2. Pressure Rating: From 10 in-wc to 1 in-wc negative.
 3. Temperature Range: Minus 20 to 210 degrees F.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install, support, and seal ducts in accordance with SMACNA (DCS).
- B. Install products following the manufacturer's instructions.
- C. Comply with safety standards NFPA 90A and NFPA 90B.
- D. During construction, provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering the ductwork system.
- E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- F. Flexible Ducts: Connect to metal ducts with adhesive plus sheet metal screws.
- G. Duct sizes indicated are precise inside dimensions. For lined ducts, maintain sizes inside lining.
- H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

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HVAC DUCTS AND CASINGS

- I. Connect diffusers or light troffer boots to low pressure ducts with 5 feet maximum length of flexible duct held in place with strap or clamp.

END OF SECTION

100% CONSTRUCTION DOCUMENTS
AIR DUCT ACCESSORIES

SECTION 23 33 00
AIR DUCT ACCESSORIES

100% CONSTRUCTION DOCUMENTS

AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flexible duct connectors.
- B. Volume control dampers.
- C. Miscellaneous Products:
 - 1. Duct opening closure film.

1.02 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- B. NFPA 92 - Standard for Smoke Control Systems; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; 2024.
- D. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.
- E. UL 555 - Standard for Fire Dampers; Current Edition, Including All Revisions.
- F. UL 555S - Standard for Smoke Dampers; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers.

1.04 QUALITY ASSURANCE

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

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect dampers from damage to operating linkages and blades.

PART 2 PRODUCTS

2.01 FLEXIBLE DUCT CONNECTORS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Flexible Duct Connections: Fabric crimped into metal edging strip.
- C. Maximum Installed Length: 14 inch.

2.02 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA (DCS) and as indicated.
- B. Single Blade Dampers:
 - 1. Fabricate for duct sizes up to 6 by 30 inch.
 - 2. Blade: 24 gauge, 0.0239 inch, minimum.
- C. Multi-Blade Damper: Fabricate consisting of opposed blades with maximum blade sizes 8 by 72 inches. Assemble center- and edge-crimped blades in prime-coated or galvanized-channel frame with suitable hardware.
- D. End Bearings: Except in round ducts 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon, thermoplastic elastomer, or sintered bronze bearings.
- E. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
 - 2. On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

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AIR DUCT ACCESSORIES

2.03 MISCELLANEOUS PRODUCTS

- A. Duct Opening Closure Film: Mold-resistant, self-adhesive film to keep debris out of ducts during construction.
 - 1. Thickness: 2 mils.

PART 3 EXECUTION

3.01 PREPARATION

- A. Verify that electric power is available and of the correct characteristics.

3.02 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA (DCS). See Section 23 31 00 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96 Provide minimum 8 by 8 inch size access door for hand and shoulder access, or as indicated on drawings. Provide minimum 4 by 4 inch size access door for balancing dampers only. Review locations prior to fabrication.
- D. Provide duct test holes where indicated and required for testing and balancing purposes.
- E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire-rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- F. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92.
- G. Demonstrate re-setting of fire dampers to Owner's representative.
- H. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum two duct widths from duct take-off.
- I. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

END OF SECTION

SECTION 23 37 00
AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 Section Includes

- A. Diffusers:
 - 1. Rectangular ceiling diffusers.
- B. Registers/grilles:
 - 1. Ceiling-mounted, egg crate exhaust and return register/grilles.
 - 2. Wall-mounted, supply register/grilles.
- C. Duct-mounted supply and return registers/louvers.
- D. Goosenecks.

1.02 Reference Standards

- A. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.
- B. SMACNA (DCS) - HVAC Duct Construction Standards Metal and Flexible; 2020.

1.03 Submittals

- A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.04 Quality Assurance

PART 2 PRODUCTS

2.01 Manufacturers

2.02 Rectangular Ceiling Diffusers

- A. Type: Provide square, stamped, multi-core diffuser to discharge air in 360 degree, one way, two way, and three way pattern with sectorizing baffles where indicated.
- B. Connections: Round.
- C. Frame: Provide inverted T-bar type.
- D. Fabrication: Aluminum with baked enamel finish.
- E. Accessories: Provide radial opposed blade volume control damper; removable core, sectorizing baffle, and safety chain with damper adjustable from diffuser face.

2.03 Duct-Mounted Supply and Return Registers/Louvers

- A. Type: Duct-mounted, rectangular register for round-spiral duct with adjustable pivot-ended blades, end caps, built-in volume damper, and dual cover flanges to lay flush on duct surface regardless of diameter. Performance to match manufacturer's catalog data.
- B. Material: 22 gauge, 0.0299 inch.
 - 1. Provide crossing spiral fitting-body of matching duct diameter.

2.04 Ceiling Egg Crate Exhaust and Return Grilles

- A. Type: Egg crate style face consisting of 1/2 by 1/2 by 1/2 inch grid core.
- B. Fabrication: Grid core consists of aluminum with mill aluminum finish.
- C. Frame: Channel lay-in frame for suspended grid ceilings.
- D. Accessories: Provide 45 degree angled eggcrate or other similar provisions for visual blocking such as angled louver, 90 degree duct elbow, etc..

100% CONSTRUCTION DOCUMENTS

AIR OUTLETS AND INLETS

2.05 Wall Supply Registers/Grilles

- A. Type: Streamlined and individually adjustable blades, 3/4 inch minimum depth, 3/4 inch maximum spacing with spring or other device to set blades, vertical face, double deflection.
- B. Fabrication: Steel with 20 gauge, 0.0359 inch minimum frames and 22 gauge, 0.0299 inch minimum blades, steel and aluminum with 20 gauge, 0.0359 inch minimum frame, or aluminum extrusions, with factory baked enamel finish.
- C. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

2.06 Goosenecks

- A. Fabricate in accordance with of minimum 18 gauge, 0.0598 inch galvanized steel.
- B. Mount on minimum 12 inch high curb base where size exceeds 9 by 9 inch.

PART 3 EXECUTION

3.01 Installation

- A. Install in accordance with manufacturer's instructions.
- B. Comply with SMACNA (ASMM) for flashing/counter-flashing of roof penetrations and supports for roof curbs and roof mounted equipment.
- C. Check location of outlets and inlets and make necessary adjustments in position to comply with architectural features, symmetry, and lighting arrangement.
- D. Install diffusers to ductwork with air tight connection.
- E. Provide balancing dampers on duct take-off to diffusers and grilles and registers, despite whether dampers are specified as part of diffuser, or grille and register assembly.

3.02 Protection

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

END OF SECTION

SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS

SECTION 23 81 26.13

SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Air-source heat pumps.
- B. Air cooled condensing units.
- C. Indoor air handling (fan and coil) units for ducted systems.
- D. Indoor air handling (fan and coil) units for ductless systems.
- E. Controls.

1.02 REFERENCE STANDARDS

- A. AHRI 210/240 - Performance Rating of Unitary Air-Conditioning and Air-Source Heat Pump Equipment; 2023.
- B. AHRI 520 - Performance Rating of Positive Displacement Condensing Units; 2004.
- C. ASHRAE Std 23 - Methods for Performance Testing Positive Displacement Refrigerant Compressors and Compressor Units; 2022.
- D. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NEMA MG 1 - Motors and Generators; 2021.
- F. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; 2024.
- G. NFPA 90B - Standard for the Installation of Warm Air Heating and Air-Conditioning Systems; 2024.
- H. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances; 2024.
- I. UL 207 - Standard for Refrigerant-Containing Components and Accessories, Nonelectrical; Current Edition, Including All Revisions.

1.03 SUBMITTALS

- A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.
- B. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

1.04 QUALITY ASSURANCE

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 SYSTEM DESIGN

- A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.
 - 1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator. 100% heating capacity rating at 0 Deg. F.
 - 2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.
- B. Performance Requirements: See Drawings for additional requirements.

SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS

1. Efficiency:
 - a. Seasonal Energy Efficiency Ratio: 10.0, minimum.
 - b. Energy Efficiency Ratio: 12.
 - c. Heating Seasonal Performance Factor: 6.8, minimum.
 - d. Comply with ASHRAE Std 90.1.

2.03 INDOOR AIR HANDLING UNITS FOR DUCTED SYSTEMS

- A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating and cooling element(s), controls, and accessories; wired for single power connection with control transformer.
 1. Air Flow Configuration: Horizontal.
 2. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
- B. Supply Fan: Centrifugal type rubber mounted with direct or belt drive with adjustable variable pitch motor pulley.
 1. Motor: NEMA MG 1; 1750 rpm single speed, permanently lubricated, hinge mounted.
 2. Motor Electrical Characteristics:
- C. Air Filters: 1 inch thick glass fiber, disposable type arranged for easy replacement.
- D. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
 1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
 2. Manufacturers: System manufacturer.

2.04 INDOOR AIR HANDLING UNITS FOR DUCTLESS SYSTEMS

- A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and controls; wired for single power connection with control transformer.
 1. Location: High-wall.
- B. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.
 1. Construction and Ratings: In accordance with AHRI 210/240 and UL 207.
 2. Manufacturer: System manufacturer.

2.05 OUTDOOR UNITS

- A. Outdoor Units: Self-contained, packaged, pre-wired unit consisting of cabinet, with compressor and condenser.
 1. Comply with AHRI 210/240.
 2. Refrigerant: Use only refrigerants that have ozone depletion potential (ODP) of zero and global warming potential (GWP) of less than 50.
 3. Construction and Ratings: In accordance with AHRI 210/240 with testing in accordance with ASHRAE Std 23 and UL 207.
- B. Air Cooled Condenser: Aluminum fin and copper tube coil, AHRI 520 with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

100% CONSTRUCTION DOCUMENTS

SMALL-CAPACITY SPLIT-SYSTEM AIR CONDITIONERS

- C. Accessories: Filter drier, high-pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, thermometer well (in liquid line).
 - 1. Provide thermostatic expansion valves.
- D. Operating Controls:
 - 1. Control by room thermostat to maintain room temperature setting.

2.06 ACCESSORY EQUIPMENT

- A. Room Thermostat: Wall-mounted, electric solid state microcomputer based room thermostat with remote sensor to maintain temperature setting; low-voltage; with following features:
 - 1. Automatic switching from heating to cooling.
 - 2. Preferential rate control to minimize overshoot and deviation from setpoint.
 - 3. Short cycle protection.
 - 4. Programming based on weekdays, Saturday and Sunday.
 - 5. Thermostat Display:
 - a. Time of day.
 - b. Actual room temperature.
 - c. Programmed temperature.
 - d. Day of week.
 - e. System Mode Indication: Heating, Cooling, Fan Auto, Off, and On, Auto or On, Off.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.
- B. Verify that proper power supply is available and in correct location.
- C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.
- B. Install in accordance with NFPA 90A and NFPA 90B.
- C. Provide vent connections in accordance with NFPA 211.

END OF SECTION

SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Single conductor building wire.
- B. Underground feeder and branch-circuit cable.
- C. Service entrance cable.
- D. Armored cable.
- E. Metal-clad cable.
- F. Wiring connectors.

1.02 RELATED REQUIREMENTS

- A. Section 26 0505 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 3100 - Photovoltaic Collectors: Additional wiring requirements for photovoltaic systems.

1.03 REFERENCE STANDARDS

- A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire; 2013.
- B. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft; 2011 (Reapproved 2017).
- C. ASTM B33 - Standard Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes; 2010 (Reapproved 2014).
- D. ASTM B787/B787M - Standard Specification for 19 Wire Combination Unilay-Stranded Copper Conductors for Subsequent Insulation; 2004 (Reapproved 2014).
- E. ASTM D3005 - Standard Specification for Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape; 2017.
- F. ASTM D4388 - Standard Specification for Nonmetallic Semi-Conducting and Electrically Insulating Rubber Tapes; 2013.
- G. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- H. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC); 2012.
- I. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF); 2007.
- J. NEMA WC 70 - Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy; 2009.
- K. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- L. UL 4 - Armored Cable; Current Edition, Including All Revisions.
- M. UL 44 - Thermoset-Insulated Wires and Cables; Current Edition, Including All Revisions.
- N. UL 83 - Thermoplastic-Insulated Wires and Cables; Current Edition, Including All Revisions.
- O. UL 486A-486B - Wire Connectors; Current Edition, Including All Revisions.
- P. UL 486C - Splicing Wire Connectors; Current Edition, Including All Revisions.
- Q. UL 486D - Sealed Wire Connector Systems; Current Edition, Including All Revisions.

- R. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables; Current Edition, Including All Revisions.
- S. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape; Current Edition, Including All Revisions.
- T. UL 1569 - Metal-Clad Cables; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS

- A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
- B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
- C. Nonmetallic-sheathed cable is not permitted.
- D. Armored cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - 1) Maximum Length: 6 feet (1.8 m).
- E. Metal-clad cable is permitted only as follows:
 - 1. Where not otherwise restricted, may be used:
 - a. Where concealed above accessible ceilings for final connections from junction boxes to luminaires.
 - 1) Maximum Length: 6 feet (1.8 m).

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
- D. Comply with NEMA WC 70.
- E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
- F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
- G. Conductor Material:
 - 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
 - 2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
 - 3. Tinned Copper Conductors: Comply with ASTM B33.

- H. Minimum Conductor Size:
 - 1. Branch Circuits: 12 AWG.
 - a. Exceptions:
 - 1) 20 A, 120 V circuits longer than 75 feet (23 m): 10 AWG, for voltage drop.
 - 2) 20 A, 120 V circuits longer than 150 feet (46 m): 8 AWG, for voltage drop.
 - 3) 20 A, 277 V circuits longer than 150 feet (46 m): 10 AWG, for voltage drop.
- I. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- J. Conductor Color Coding:
 - 1. Color Coding Method: Integrally colored insulation.
 - 2. Color Code:
 - a. 208Y/120 V, 3 Phase, 4 Wire System:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - 4) Neutral/Grounded: White.
 - b. Equipment Ground, All Systems: Green.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Conductor Stranding:
 - 1. Feeders and Branch Circuits:
 - a. Size 10 AWG and Smaller: Solid.
 - b. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation:
 - 1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.

2.04 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

- A. Description: NFPA 70, Type UF multiple-conductor cable listed and labeled as complying with UL 493, Type UF-B.
- B. Provide equipment grounding conductor unless otherwise indicated.
- C. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- D. Insulation Voltage Rating: 600 V.

2.05 SERVICE ENTRANCE CABLE

- A. Manufacturers:
 - 1. Copper Service Entrance Cable:
 - a. Cerro Wire LLC: www.cerrowire.com/#sle.
 - b. Encore Wire Corporation: www.encorewire.com/#sle.
 - c. Southwire Company: www.southwire.com/#sle.
- B. Conductor Stranding: Stranded.
- C. Insulation Voltage Rating: 600 V.

2.06 ARMORED CABLE

- A. Description: NFPA 70, Type AC cable listed and labeled as complying with UL 4, and listed for use in classified firestop systems to be used.
- B. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.

- C. Insulation Voltage Rating: 600 V.
- D. Insulation: Type THHN.
- E. Grounding: Combination of interlocking armor and integral bonding wire.
- F. Armor: Steel, interlocked tape.

2.07 METAL-CLAD CABLE

- A. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.
- B. Conductor Stranding:
 - 1. Size 10 AWG and Smaller: Solid.
 - 2. Size 8 AWG and Larger: Stranded.
- C. Insulation Voltage Rating: 600 V.
- D. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.
- E. Grounding: Full-size integral equipment grounding conductor.
- F. Armor: Steel, interlocked tape.

2.08 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.
- B. Connectors for Grounding and Bonding: Comply with Section 26 0526.
- C. Wiring Connectors for Splices and Taps:
 - 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
 - 2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.
- D. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F (105 degrees C) for standard applications and 302 degrees F (150 degrees C) for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
- E. Mechanical Connectors: Provide bolted type or set-screw type.
- F. Compression Connectors: Provide circumferential type or hex type crimp configuration.
- G. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.09 ACCESSORIES

- A. Electrical Tape:
 - 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 - 2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil (0.18 mm); resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F (-18 degrees C) and suitable for continuous temperature environment up to 221 degrees F (105 degrees C).
 - 3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil (0.76 mm); suitable for continuous temperature environment up to 194 degrees F (90 degrees C) and short-term 266 degrees F (130 degrees C) overload service.
 - 4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil (3.2 mm); suitable for continuous temperature environment up to 176 degrees F (80 degrees C).

- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
- C. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that interior of building has been protected from weather.
- B. Verify that work likely to damage wire and cable has been completed.
- C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
- D. Verify that field measurements are as indicated.
- E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Circuiting Requirements:
 - 1. Unless dimensioned, circuit routing indicated is diagrammatic.
 - 2. When circuit destination is indicated without specific routing, determine exact routing required.
 - 3. Arrange circuiting to minimize splices.
- B. Install products in accordance with manufacturer's instructions.
- C. Perform work in accordance with NECA 1 (general workmanship).
- D. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
- E. Install armored cable (Type AC) in accordance with NECA 120.
- F. Install metal-clad cable (Type MC) in accordance with NECA 120.
- G. Installation in Raceway:
 - 1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
 - 2. Pull all conductors and cables together into raceway at same time.
 - 3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
 - 4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
- H. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
- I. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
- J. Terminate cables using suitable fittings.
 - 1. Armored Cable (Type AC):
 - a. Use listed fittings and anti-short, insulating bushings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
 - 2. Metal-Clad Cable (Type MC):
 - a. Use listed fittings.
 - b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
- K. Install conductors with a minimum of 12 inches (300 mm) of slack at each outlet.

- L. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.
- M. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.
- N. Make wiring connections using specified wiring connectors.
 - 1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
 - 2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
 - 3. Do not remove conductor strands to facilitate insertion into connector.
 - 4. Clean contact surfaces on conductors and connectors to suitably remove corrosion, oxides, and other contaminants. Do not use wire brush on plated connector surfaces.
 - 5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 - 6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- O. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
- P. Insulate ends of spare conductors using vinyl insulating electrical tape.
- Q. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- R. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground rod electrodes.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
- B. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- C. Section 26 3100 - Photovoltaic Collectors: Additional grounding and bonding requirements for photovoltaic systems.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA GR 1 - Grounding Rod Electrodes and Grounding Rod Electrode Couplings; 2007.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 467 - Grounding and Bonding Equipment; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding Electrode System:
 - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
 - a. Provide continuous grounding electrode conductors without splice or joint.
 - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
 - 2. Metal Underground Water Pipe(s):
 - a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet

- (3.0 m) at an accessible location not more than 5 feet (1.5 m) from the point of entrance to the building.
- b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
 - c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.
- E. Service-Supplied System Grounding:
1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
 2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- F. Bonding and Equipment Grounding:
1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
 6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
- G. Communications Systems Grounding and Bonding:
1. Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with NFPA 70.
 2. Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
 - a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
 - b. Raceway Size: 3/4 inch (21 mm) trade size unless otherwise indicated or required.
 - c. Ground Bar Size: 1/4 by 2 by 12 inches (6 by 50 by 300 mm) unless otherwise indicated or required.

2.02 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
1. Provide products listed, classified, and labeled as suitable for the purpose intended.
 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
1. Use insulated copper conductors unless otherwise indicated.
 - a. Exceptions:
 - 1) Use bare copper conductors where installed underground in direct contact with earth.
 - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
- C. Connectors for Grounding and Bonding:

1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
- D. Ground Bars:
1. Description: Copper rectangular ground bars with mounting brackets and insulators.
 2. Size: As indicated.
 3. Holes for Connections: As indicated or as required for connections to be made.
- E. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
 2. Material: Copper-bonded (copper-clad) steel.
 3. Size: 3/4 inch (19 mm) diameter by 10 feet (3.0 m) length, unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70 or provide ground plates.
- D. Make grounding and bonding connections using specified connectors.
1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Identify grounding and bonding system components in accordance with Section 26 0553.

END OF SECTION

SECTION 26 0529
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Support and attachment requirements and components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

- A. Section 26 0533.13 - Conduit for Electrical Systems: Additional support and attachment requirements for conduits.
- B. Section 26 0533.16 - Boxes for Electrical Systems: Additional support and attachment requirements for boxes.
- C. Section 26 5100 - Interior Lighting: Additional support and attachment requirements for interior luminaires.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

1.05 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with applicable building code.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
 - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
 - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
 - 3. Do not use products for applications other than as permitted by NFPA 70 and product listing.
 - 4. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
 - a. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
 - b. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
- B. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
 - 1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
 - 2. Conduit Clamps: Bolted type unless otherwise indicated.
- C. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
- D. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
 - 1. Minimum Size, Unless Otherwise Indicated or Required:
 - a. Equipment Supports: 1/2 inch (13 mm) diameter.
 - b. Single Conduit up to 1 inch (27 mm) trade size: 1/4 inch (6 mm) diameter.
 - c. Single Conduit larger than 1 inch (27 mm) trade size: 3/8 inch (10 mm) diameter.
 - d. Outlet Boxes: 1/4 inch (6 mm) diameter.

- e. Luminaires: 1/4 inch (6 mm) diameter.
- E. Anchors and Fasteners:
 - 1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that mounting surfaces are ready to receive support and attachment components.
- C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
- D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.
- E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.
- F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.
- G. Equipment Support and Attachment:
 - 1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
 - 2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
 - 3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
 - 4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Secure fasteners according to manufacturer's recommended torque settings.
- I. Remove temporary supports.

END OF SECTION

SECTION 26 0533.13
CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Intermediate metal conduit (IMC).
- B. Flexible metal conduit (FMC).
- C. Liquidtight flexible metal conduit (LFMC).
- D. Electrical metallic tubing (EMT).
- E. Rigid polyvinyl chloride (PVC) conduit.
- F. Liquidtight flexible nonmetallic conduit (LFNC).
- G. Reinforced thermosetting resin conduit (RTRC).
- H. Conduit fittings.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping.
- B. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.
- C. Section 26 0526 - Grounding and Bonding for Electrical Systems.
 - 1. Includes additional requirements for fittings for grounding and bonding.
- D. Section 26 0529 - Hangers and Supports for Electrical Systems.
- E. Section 26 0533.16 - Boxes for Electrical Systems.
- F. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S); 2015.
- B. ANSI C80.6 - American National Standard for Electrical Intermediate Metal Conduit (EIMC); 2005.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT); 2013.
- E. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC); 2003.
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- G. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Conduit; 2013.
- H. NEMA TC 3 - Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing; 2016.
- I. NEMA TC 14 (SERIES) - Reinforced Thermosetting Resin Conduit and Fittings Series; 2015.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. UL 1 - Flexible Metal Conduit; Current Edition, Including All Revisions.
- L. UL 360 - Liquid-Tight Flexible Steel Conduit; Current Edition, Including All Revisions.
- M. UL 514B - Conduit, Tubing, and Cable Fittings; Current Edition, Including All Revisions.
- N. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings; Current Edition, Including All Revisions.
- O. UL 797 - Electrical Metallic Tubing-Steel; Current Edition, Including All Revisions.

- P. UL 1242 - Electrical Intermediate Metal Conduit-Steel; Current Edition, Including All Revisions.
- Q. UL 1660 - Liquid-Tight Flexible Nonmetallic Conduit; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.
- B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.
- C. Underground:
 - 1. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit, intermediate metallic conduit (IMC), PVC-coated galvanized steel rigid metal conduit, rigid PVC conduit, or reinforced thermosetting resin conduit (RTRC).
 - 2. Where steel conduit is installed in direct contact with earth where soil has a resistivity of less than 2000 ohm-centimeters or is characterized as severely corrosive based on soils report or local experience, use corrosion protection tape to provide supplementary corrosion protection or use PVC-coated galvanized steel rigid metal conduit.
- D. Concealed Within Hollow Stud Walls: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).
- E. Concealed Above Accessible Ceilings: Use galvanized steel rigid metal conduit, intermediate metal conduit (IMC), or electrical metallic tubing (EMT).

2.02 CONDUIT REQUIREMENTS

- A. Existing Work: Where existing conduits are indicated to be reused, they may be reused only where they comply with specified requirements, are free from corrosion, and integrity is verified by pulling a mandrel through them.
- B. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
 - 1. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 FLEXIBLE METAL CONDUIT (FMC)

- A. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.

2.05 ELECTRICAL METALLIC TUBING (EMT)

- A. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.
- B. Fittings:
 - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
 - 2. Material: Use steel or malleable iron.
 - 3. Connectors and Couplings: Use compression (gland) or set-screw type.
 - a. Do not use indenter type connectors and couplings.

2.06 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

- A. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.
- B. Fittings:
 - 1. Manufacturer: Same as manufacturer of conduit to be connected.
 - 2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.07 REINFORCED THERMOSETTING RESIN CONDUIT (RTRC)

- A. Description: NFPA 70, Type RTRC reinforced thermosetting resin conduit complying with NEMA TC 14 (SERIES).
- B. Supports: Per manufacturer's recommendations.
- C. Fittings: Same type and manufacturer as conduit to be connected.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
- D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
- E. Install PVC-coated galvanized steel rigid metal conduit (RMC) using only tools approved by the manufacturer.
- F. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
- G. Install liquidtight flexible nonmetallic conduit (LFNC) in accordance with NECA 111.
- H. Conduit Routing:
 - 1. Unless dimensioned, conduit routing indicated is diagrammatic.
 - 2. When conduit destination is indicated without specific routing, determine exact routing required.
 - 3. Conceal all conduits unless specifically indicated to be exposed.
 - 4. Conduits in the following areas may be exposed, unless otherwise indicated:
 - a. Electrical rooms.

5. Conduits installed underground or embedded in concrete may be routed in the shortest possible manner unless otherwise indicated. Route all other conduits parallel or perpendicular to building structure and surfaces, following surface contours where practical.
 6. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
- I. Conduit Support:
1. Secure and support conduits in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
 4. Use conduit strap to support single surface-mounted conduit.
 - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
 5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
 6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
 7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
- J. Connections and Terminations:
1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
 3. Use suitable adapters where required to transition from one type of conduit to another.
 4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
 5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
 6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.
 7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.
- K. Penetrations:
1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
 2. Make penetrations perpendicular to surfaces unless otherwise indicated.
 3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
 4. Conceal bends for conduit risers emerging above ground.
 5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
 6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
 7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
 8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- L. Underground Installation:

1. Minimum Cover, Unless Otherwise Indicated or Required:
 - a. Underground, Exterior: 24 inches (610 mm).
 2. Provide underground warning tape in accordance with Section 26 0553 along entire conduit length for service entrance where not concrete-encased.
- M. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
 2. Where calculated in accordance with NFPA 70 for rigid polyvinyl chloride (PVC) conduit installed above ground to compensate for thermal expansion and contraction.
 3. Where calculated in accordance with NFPA 70 for reinforced thermosetting resin conduit (RTRC) conduit installed above ground to compensate for thermal expansion and contraction.
 4. Where conduits are subject to earth movement by settlement or frost.
- N. Provide grounding and bonding in accordance with Section 26 0526.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
- C. Correct deficiencies and replace damaged or defective conduits.

END OF SECTION

SECTION 26 0533.16
BOXES FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Outlet and device boxes up to 100 cubic inches (1,650 cu cm), including those used as junction and pull boxes.
- B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches (1,650 cu cm).
- C. Floor boxes.

1.02 RELATED REQUIREMENTS

- A. Section 08 3100 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0529 - Hangers and Supports for Electrical Systems.
- D. Section 26 0533.13 - Conduit for Electrical Systems:
 - 1. Conduit bodies and other fittings.
- E. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 2726 - Wiring Devices:
 - 1. Wall plates.
 - 2. Floor box service fittings.
 - 3. Access floor boxes.
- G. Section 27 1000 - Structured Cabling: Additional requirements for communications systems outlet boxes.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; 2014.
- D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; 2013.
- E. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 508A - Industrial Control Panels; 2013.
- J. UL 514A - Metallic Outlet Boxes; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 BOXES

- A. General Requirements:
 - 1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
 - 2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
 - 3. Provide products listed, classified, and labeled as suitable for the purpose intended.
 - 4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
 - 5. Provide grounding terminals within boxes where equipment grounding conductors terminate.
- B. Outlet and Device Boxes Up to 100 cubic inches (1,650 cu cm), Including Those Used as Junction and Pull Boxes:
 - 1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
 - 2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
 - 3. Use suitable concrete type boxes where flush-mounted in concrete.
 - 4. Use suitable masonry type boxes where flush-mounted in masonry walls.
 - 5. Use raised covers suitable for the type of wall construction and device configuration where required.
 - 6. Use shallow boxes where required by the type of wall construction.
 - 7. Do not use "through-wall" boxes designed for access from both sides of wall.
 - 8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
 - 9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
 - 10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
 - 11. Boxes for Ganged Devices: Use multigang boxes of single-piece construction. Do not use field-connected gangable boxes unless specifically indicated or permitted.
 - 12. Minimum Box Size, Unless Otherwise Indicated:
 - a. Communications Systems Outlets: Comply with Section 27 1000.
 - 13. Wall Plates: Comply with Section 26 2726.
- C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - 1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
 - 2. NEMA 250 Environment Type, Unless Otherwise Indicated:
 - 3. Junction and Pull Boxes Larger Than 100 cubic inches (1,650 cu cm):
 - a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.
- D. Floor Boxes:
 - 1. Description: Floor boxes compatible with floor box service fittings provided in accordance with Section 26 2726; with partitions to separate multiple services; furnished with all components, adapters, and trims required for complete installation.
 - 2. Manufacturer: Same as manufacturer of floor box service fittings.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install boxes in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Box Locations:
 - 1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 3100 as required where approved by the Architect.
 - 2. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches (150 mm) horizontal separation unless otherwise indicated.
 - 3. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
 - a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches (610 mm) separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
- E. Box Supports:
 - 1. Secure and support boxes in accordance with NFPA 70 and Section 26 0529 using suitable supports and methods approved by the authority having jurisdiction.
 - 2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
- F. Install boxes plumb and level.
- G. Flush-Mounted Boxes:
 - 1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch (6 mm) or does not project beyond finished surface.
 - 2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
 - 3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch (3 mm) at the edge of the box.
- H. Install boxes as required to preserve insulation integrity.
- I. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
- J. Close unused box openings.
- K. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment installed or designated for future use.
- L. Provide grounding and bonding in accordance with Section 26 0526.

END OF SECTION

SECTION 26 0553
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical identification requirements.
- B. Identification nameplates and labels.
- C. Wire and cable markers.
- D. Voltage markers.
- E. Underground warning tape.
- F. Warning signs and labels.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Color coding for power conductors and cables 600 V and less; vinyl color coding electrical tape.
- B. Section 26 3100 - Photovoltaic Collectors: Additional identification requirements for photovoltaic systems.

1.03 REFERENCE STANDARDS

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- B. UL 969 - Marking and Labeling Systems; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittals procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 IDENTIFICATION REQUIREMENTS

- A. Identification for Equipment:
 - 1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
 - a. Panelboards:
 - 1) Identify power source and circuit number. Include location when not within sight of equipment.
 - 2) Use typewritten circuit directory to identify load(s) served for panelboards with a door. Identify spares and spaces using pencil.
 - 3) For power panelboards without a door, use identification nameplate to identify load(s) served for each branch device. Do not identify spares and spaces.
 - b. Enclosed switches, circuit breakers, and motor controllers:
 - 1) Identify power source and circuit number. Include location when not within sight of equipment.
 - c. Time Switches:
 - 1) Identify load(s) served and associated circuits controlled. Include location.
 - 2. Service Equipment:
 - a. Use identification nameplate to identify each service disconnecting means.
 - 3. Available Fault Current Documentation: Use identification label to identify the available fault current and date calculations were performed at locations requiring documentation by NFPA 70, including but not limited to the following.

- a. Service equipment.
 - b. Industrial control panels.
 - c. Motor control centers.
 - d. Elevator control panels.
 - e. Industrial machinery.
- B. Identification for Conductors and Cables:
- 1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 0519.
 - 2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.02 IDENTIFICATION NAMEPLATES AND LABELS

- A. Identification Nameplates:
- 1. Materials:
 - a. Indoor Clean, Dry Locations: Use plastic nameplates.
 - 2. Plastic Nameplates: Two-layer or three-layer laminated acrylic or electrically non-conductive phenolic with beveled edges; minimum thickness of 1/16 inch (1.6 mm); engraved text.
 - 3. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch (25 mm) high; Four, located at corners for larger sizes.
- B. Identification Labels:
- 1. Manufacturers:
 - a. Brady Corporation; _____: www.bradyid.com/#sle.
 - b. Brother International Corporation: www.brother-usa.com/#sle.
 - c. Panduit Corp: www.panduit.com/#sle.
 - 2. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
 - 3. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

2.03 WIRE AND CABLE MARKERS

- A. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.
- B. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.
- C. Legend: Power source and circuit number or other designation indicated.
- D. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.
- E. Minimum Text Height: 1/8 inch (3 mm).
- F. Color: Black text on white background unless otherwise indicated.

2.04 VOLTAGE MARKERS

- A. Minimum Size:
- 1. Markers for Equipment: 1 1/8 by 4 1/2 inches (29 by 110 mm).
- B. Legend:
- 1. Markers for Voltage Identification: Highest voltage present.
- C. Color: Black text on orange background unless otherwise indicated.

2.05 UNDERGROUND WARNING TAPE

- A. Manufacturers:
- 1. Brady Corporation; _____: www.bradyid.com/#sle.
 - 2. Brimar Industries, Inc: www.brimar.com/#sle.

- 3. Seton Identification Products; _____: www.seton.com/#sle.
- B. Materials: Use non-detectable type polyethylene tape suitable for direct burial, unless otherwise indicated.
- C. Non-detectable Type Tape: 6 inches (152 mm) wide, with minimum thickness of 4 mil (0.1 mm).
- D. Legend: Type of service, continuously repeated over full length of tape.
- E. Color:

2.06 WARNING SIGNS AND LABELS

- A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
- B. Warning Signs:
 - 1. Materials:
 - 2. Minimum Size: 7 by 10 inches (178 by 254 mm) unless otherwise indicated.
- C. Warning Labels:
 - 1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
 - 2. Machine-Printed Labels: Use thermal transfer process printing machines and accessories recommended by label manufacturer.
 - 3. Minimum Size: 2 by 4 inches (51 mm by 102 mm) unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
 - 1. Surface-Mounted Equipment: Enclosure front.
 - 2. Flush-Mounted Equipment: Inside of equipment door.
 - 3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
 - 4. Elevated Equipment: Legible from the floor or working platform.
 - 5. Branch Devices: Adjacent to device.
 - 6. Interior Components: Legible from the point of access.
 - 7. Conductors and Cables: Legible from the point of access.
- C. Install identification products centered, level, and parallel with lines of item being identified.
- D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.
- E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.
- F. Install underground warning tape above buried lines with one tape per trench at 3 inches (75 mm) below finished grade.
- G. Mark all handwritten text, where permitted, to be neat and legible.

END OF SECTION

SECTION 26 0583
WIRING CONNECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Electrical connections to equipment.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables.
- B. Section 26 0533.13 - Conduit for Electrical Systems.
- C. Section 26 0533.16 - Boxes for Electrical Systems.
- D. Section 26 2726 - Wiring Devices.
- E. Section 26 2816.16 - Enclosed Switches.

1.03 REFERENCE STANDARDS

- A. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
- B. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
 - 1. Colors: Comply with NEMA WD 1.
 - 2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
 - 3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
- B. Disconnect Switches: As specified in Section 26 2816.16 and in individual equipment sections.
- C. Wiring Devices: As specified in Section 26 2726.
- D. Flexible Conduit: As specified in Section 26 0533.13.
- E. Wire and Cable: As specified in Section 26 0519.
- F. Boxes: As specified in Section 26 0533.16.

2.02 EQUIPMENT CONNECTIONS

- A. lighting, motors, hvac equipment.:
 - 1. Electrical Connection: Flexible conduit.

PART 3 EXECUTION

3.01 ELECTRICAL CONNECTIONS

- A. Make electrical connections in accordance with equipment manufacturer's instructions.
- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.

- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Provide receptacle outlet to accommodate connection with attachment plug.
- E. Provide cord and cap where field-supplied attachment plug is required.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.
- H. Install terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 26 0923
LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Occupancy sensors.
- B. Time switches.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0533.16 - Boxes for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 26 2726 - Wiring Devices: Devices for manual control of lighting, including wall switches, wall dimmers, and fan speed controllers.
- F. Section 26 5100 - Interior Lighting.
- G. Section 26 5600 - Exterior Lighting.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 916 - Energy Management Equipment; Current Edition, Including All Revisions.
- F. UL 917 - Clock-Operated Switches; Current Edition, Including All Revisions.
- G. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.
- C. Field Quality Control Reports.
- D. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.07 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.01 LIGHTING CONTROL DEVICES - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

2.02 OCCUPANCY SENSORS

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Lutron Electronics Company, Inc: www.lutron.com/#sle.
 - 3. Sensor Switch Inc: www.sensorswitch.com/#sle.
 - 4. WattStopper: www.wattstopper.com/#sle.
 - 5. Leviton.
- B. All Occupancy Sensors:
 - 1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
 - 2. Sensor Technology:
 - a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.
 - b. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.
 - c. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.
 - 3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.
 - 4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.
 - 5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.
 - 6. Turn-Off Delay: Field adjustable, with time delay settings up to 30 minutes.
 - 7. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.
 - 8. Compatibility (Non-Dimming Sensors): Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.
- C. Wall Switch Occupancy Sensors:
 - 1. All Wall Switch Occupancy Sensors:
 - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.
 - b. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.
 - 2. Passive Infrared (PIR) Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq m).
 - 3. Ultrasonic Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 400 square feet (37.2 sq m).

4. Passive Infrared/Ultrasonic Dual Technology Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq m).
- D. Wall Dimmer Occupancy Sensors:
1. General Requirements:
 - a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated dimming control capability, and no leakage current to load in off mode.
 - b. Dimmer: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, and listed as complying with UL 1472; type and rating suitable for load controlled.
 2. Passive Infrared (PIR) Wall Dimmer Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq m).
- E. Ceiling Mounted Occupancy Sensors:
1. All Ceiling Mounted Occupancy Sensors:
 - a. Description: Low profile occupancy sensors designed for ceiling installation.
 - b. Finish: White unless otherwise indicated.
 2. Passive Infrared (PIR) Ceiling Mounted Occupancy Sensors:
 - a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 square meters) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
 - b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet (111.5 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
 3. Ultrasonic Ceiling Mounted Occupancy Sensors:
 - a. Standard Range Sensors: Capable of detecting motion within an area of 500 square feet (46.5 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
 - b. Medium Range Sensors: Capable of detecting motion within an area of 1,000 square feet (92.9 sq m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
 - c. Extended Range Sensors: Capable of detecting motion within an area of 2,000 square feet (185.8 sq m) at a mounting height of 9 feet (2.7 m).
- F. Power Packs for Low Voltage Occupancy Sensors:
1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
 2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on drawings.
 3. Input Supply Voltage: Dual rated for 120/277 V ac.

2.03 TIME SWITCHES

- A. Manufacturers:
1. Intermatic, Inc: www.intermatic.com/#sle.
- B. Digital Electronic Time Switches:
1. Description: Factory-assembled solid state programmable controller with LCD display, listed and labeled as complying with UL 916 or UL 917.
 2. Program Capability:
 - a. 24-Hour Time Switches: Single channel, with same schedule for each day of the week and skip-a-day feature to omit selected days.
 - b. Astronomic Time Switches: Single channel, capable of different schedule for each day of the week with additional holiday schedule available to override normal schedule for selected days and field-configurable astronomic feature to automatically adjust for seasonal changes in sunrise and sunset times.

3. Schedule Capacity: Not less than 16 programmable on/off operations.
4. Provide automatic daylight savings time and leap year compensation.
5. Provide power outage backup to retain programming and maintain clock.
6. Manual override: Capable of overriding current schedule both permanently and temporarily until next scheduled event.
7. Input Supply Voltage: As indicated on the drawings.
8. Provide lockable enclosure; environmental type per NEMA 250 as specified for the following installation locations:

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install lighting control devices in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of lighting control devices provided under this section.
- C. Install lighting control devices in accordance with manufacturer's instructions.
- D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- E. Install lighting control devices plumb and level, and held securely in place.
- F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 2726.
- G. Provide required supports in accordance with Section 26 0529.
- H. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- I. Occupancy Sensor Locations:
 1. Location Adjustments: Within the design intent, reasonably minor adjustments to locations may be made in order to optimize coverage and avoid conflicts or problems affecting coverage.
 2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet (1.2 m) from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect each lighting control device for damage and defects.
- C. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.
- D. Test time switches to verify proper operation.
- E. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.03 ADJUSTING

- A. Adjust devices and wall plates to be flush and level.
- B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by Architect.
- C. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

- D. Adjust time switch settings to achieve desired operation schedule as indicated or as directed by Architect. Record settings in written report to be included with submittals.

3.04 CLOSEOUT ACTIVITIES

- A. Training: Train Owner's personnel on operation, adjustment, programming, and maintenance of lighting control devices.
 - 1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

END OF SECTION

SECTION 26 2416

PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Overcurrent protective devices for panelboards.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0529 - Hangers and Supports for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.
- C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- D. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; 2013.
- E. NETA ATS - Acceptance Testing Specifications for Electrical Power Equipment and Systems; 2017.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- H. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- I. UL 67 - Panelboards; Current Edition, Including All Revisions.
- J. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation: www.eaton.com/#sle.
- B. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- C. Siemens Industry, Inc: www.usa.siemens.com/#sle.
- D. Source Limitations: Furnish panelboards and associated components produced by the same manufacturer as the other electrical distribution equipment used for this project and obtained from a single supplier.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
- C. Short Circuit Current Rating:
 - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 - 1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - 3. Fronts:
 - 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.03 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
 - 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
 - 2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - 1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 - 3. Conductor Terminations:
 - a. Provide mechanical lugs unless otherwise indicated.
 - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 4. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.
 - 5. Provide the following circuit breaker types where indicated:
 - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.

- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Install panelboards plumb.
- G. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.
- H. Provide grounding and bonding in accordance with Section 26 0526.
- I. Install all field-installed branch devices, components, and accessories.
- J. Provide filler plates to cover unused spaces in panelboards.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.
- D. Test GFCI circuit breakers to verify proper operation.
- E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.03 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 2726
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Wall switches.
- B. Wall dimmers.
- C. Receptacles.
- D. Wall plates.
- E. Floor box service fittings.

1.02 RELATED REQUIREMENTS

- A. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0533.16 - Boxes for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 26 0583 - Wiring Connections: Cords and plugs for equipment.
- F. Section 26 0923 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.
- G. Section 27 1000 - Structured Cabling: Voice and data jacks.

1.03 REFERENCE STANDARDS

- A. FS W-C-596 - Connector, Electrical, Power, General Specification for; 2017h.
- B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); 2017g.
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA 130 - Standard for Installing and Maintaining Wiring Devices; 2010.
- E. NEMA WD 1 - General Color Requirements for Wiring Devices; 1999 (Reaffirmed 2015).
- F. NEMA WD 6 - Wiring Devices - Dimensional Specifications; 2016.
- G. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.
- I. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.
- J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.
- K. UL 943 - Ground-Fault Circuit-Interrupters; Current Edition, Including All Revisions.
- L. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.
- B. Products: Listed, classified, and labeled as suitable for the purpose intended.

PART 2 PRODUCTS

2.01 WIRING DEVICE APPLICATIONS

- A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
- B. Provide weather resistant GFCI receptacles with specified weatherproof covers for receptacles installed outdoors or in damp or wet locations.
- C. Provide GFCI protection for receptacles installed within 6 feet (1.8 m) of sinks.
- D. Provide GFCI protection for receptacles installed in kitchens.
- E. Provide GFCI protection for receptacles serving electric drinking fountains.

2.02 WIRING DEVICE FINISHES

- A. Provide wiring device finishes as described below unless otherwise indicated.
- B. Wiring Devices, Unless Otherwise Indicated: White with stainless steel wall plate.

2.03 WALL SWITCHES

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
- B. Wall Switches - General Requirements: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
- C. Standard Wall Switches: Industrial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.

2.04 RECEPTACLES

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 - 3. Lutron Electronics Company, Inc; Designer Style: www.lutron.com/#sle.
- B. Receptacles - General Requirements: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
 - 1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
 - 2. NEMA configurations specified are according to NEMA WD 6.
- C. Convenience Receptacles:
 - 1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
 - 2. Weather Resistant Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R, listed and labeled as weather resistant type complying with UL 498 Supplement SE suitable for installation in damp or wet locations; single or duplex as indicated on the drawings.
- D. GFCI Receptacles:
 - 1. GFCI Receptacles - General Requirements: Self-testing, with feed-through protection and light to indicate ground fault tripped condition and loss of protection; listed as complying with UL 943, class A.
 - a. Provide test and reset buttons of same color as device.
 - 2. Standard GFCI Receptacles: Industrial specification grade, duplex, 20A, 125V, NEMA 5-20R, rectangular decorator style.

2.05 WALL PLATES

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell-wiring.com/#sle.
 - 2. Leviton Manufacturing Company, Inc: www.leviton.com/#sle.
 - 3. Lutron Electronics Company, Inc: www.lutron.com/#sle.
- B. Wall Plates: Comply with UL 514D.
 - 1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
 - 2. Size: Standard.
 - 3. Screws: Metal with slotted heads finished to match wall plate finish.
- C. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.

2.06 FLOOR BOX SERVICE FITTINGS

- A. Manufacturers:
 - 1. Hubbell Incorporated: www.hubbell.com/#sle.
 - 2. Thomas & Betts Corporation: www.tnb.com/#sle.
 - 3. Wiremold, a brand of Legrand North America, Inc: www.legrand.us/#sle.
- B. Description: Service fittings compatible with floor boxes provided under Section 26 0533.16 with components, adapters, and trims required for complete installation.
- C. Flush Floor Service Fittings:
 - 1. Dual Service Flush Combination Outlets:
 - a. Cover: Rectangular.
 - b. Configuration:
 - 1) Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
 - 2) Communications: _____.
 - 3) Voice and Data Jacks: As specified in Section 27 1000.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship) and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
- B. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of wiring devices provided under this section.
 - 1. Mounting Heights: Unless otherwise indicated, as follows:
 - a. Wall Switches: 48 inches (1200 mm) above finished floor.
 - b. Receptacles: 18 inches (450 mm) above finished floor or 6 inches (150 mm) above counter.
- C. Install wiring devices in accordance with manufacturer's instructions.
- D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
- E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.
- F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
- G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
- H. Install wiring devices plumb and level with mounting yoke held rigidly in place.
- I. Install wall switches with OFF position down.

- J. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.
- K. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.
- L. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect each wiring device for damage and defects.
- C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
- D. Test each receptacle to verify operation and proper polarity.
- E. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
- F. Correct wiring deficiencies and replace damaged or defective wiring devices.

END OF SECTION

SECTION 26 2816.13
ENCLOSED CIRCUIT BREAKERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Enclosed circuit breakers.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0548 - Vibration and Seismic Controls for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- D. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- E. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- F. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for circuit breakers, enclosures, and other installed components and accessories.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Eaton Corporation: www.eaton.com/#sle.
- B. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- C. Siemens Industry, Inc: www.usa.siemens.com/#sle.

2.02 ENCLOSED CIRCUIT BREAKERS

- A. Description: Units consisting of molded case circuit breakers individually mounted in enclosures.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).
- D. Short Circuit Current Rating:
- E. Conductor Terminations: Suitable for use with the conductors to be installed.

- F. Provide solidly bonded equipment ground bus in each enclosed circuit breaker, with a suitable lug for terminating each equipment grounding conductor.
- G. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
- H. Provide externally operable handle with means for locking in the OFF position.

2.03 MOLDED CASE CIRCUIT BREAKERS

- A. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
- B. Interrupting Capacity:
 - 1. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - 2. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
- C. Conductor Terminations:
 - 1. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
- D. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
- E. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install enclosed circuit breakers plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed circuit breakers such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.

3.02 CLEANING

- A. Clean dirt and debris from circuit breaker enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 2816.16
ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Enclosed safety switches.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.

1.03 REFERENCE STANDARDS

- A. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- B. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.
- C. NEMA KS 1 - Heavy Duty Enclosed and Dead-Front Switches (600 Volts Maximum); 2013.
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- F. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- G. UL 98 - Enclosed and Dead-Front Switches; Current Edition, Including All Revisions.
- H. UL 869A - Reference Standard for Service Equipment; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. ABB/GE: www.geindustrial.com/#sle.
- B. Eaton Corporation: www.eaton.com/#sle.
- C. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
- D. Siemens Industry, Inc: www.usa.siemens.com/#sle.

2.02 ENCLOSED SAFETY SWITCHES

- A. Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet (2,000 m).
 - 2. Ambient Temperature: Between -22 degrees F (-30 degrees C) and 104 degrees F (40 degrees C).
- D. Horsepower Rating: Suitable for connected load.
- E. Voltage Rating: Suitable for circuit voltage.
- F. Short Circuit Current Rating:
 - 1. Provide enclosed safety switches, when protected by the fuses or supply side overcurrent protective devices to be installed, with listed short circuit current rating not less than the available fault current at the installed location as indicated on the drawings.

- G. Enclosed Safety Switches Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
- H. Provide with switch blade contact position that is visible when the cover is open.
- I. Conductor Terminations: Suitable for use with the conductors to be installed.
- J. Provide solidly bonded equipment ground bus in each enclosed safety switch, with a suitable lug for terminating each equipment grounding conductor.
- K. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
- L. Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
- M. Heavy Duty Switches:
 - 1. Comply with NEMA KS 1.
 - 2. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 3. Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install enclosed switches plumb.
- F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.
- G. Provide grounding and bonding in accordance with Section 26 0526.

3.02 CLEANING

- A. Clean dirt and debris from switch enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

SECTION 26 5100
INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior luminaires.
- B. Emergency lighting units.
- C. Exit signs.
- D. Ballasts and drivers.

1.02 RELATED REQUIREMENTS

- A. Section 26 0529 - Hangers and Supports for Electrical Systems.
- B. Section 26 0533.16 - Boxes for Electrical Systems.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 0923 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.
- E. Section 26 2726 - Wiring Devices: Manual wall switches and wall dimmers.

1.03 REFERENCE STANDARDS

- A. IES LM-79 - Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products; 2008.
- B. IES LM-80 - Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays, and Modules; 2015, with Errata (2017).
- C. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- D. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; 2006.
- E. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; 2006.
- F. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. NFPA 101 - Life Safety Code; 2017.
- H. UL 924 - Emergency Lighting and Power Equipment; Current Edition, Including All Revisions.
- I. UL 1598 - Luminaires; Current Edition, Including All Revisions.
- J. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
 - 1. LED Luminaires:
 - a. Include estimated useful life, calculated based on IES LM-80 test data.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND PROTECTION

- A. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide three year manufacturer warranty for LED luminaires, including drivers.
- C. Provide five year pro-rata warranty for batteries for emergency lighting units.

PART 2 PRODUCTS

2.01 LUMINAIRE TYPES

- A. Furnish products as indicated in luminaire schedule included on the drawings.

2.02 LUMINAIRES

- A. Provide products that comply with requirements of NFPA 70.
- B. Provide products that are listed and labeled as complying with UL 1598, where applicable.
- C. Provide products listed, classified, and labeled as suitable for the purpose intended.
- D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.
- E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.
- F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.
- G. LED Luminaires:
 - 1. Components: UL 8750 recognized or listed as applicable.
 - 2. Tested in accordance with IES LM-79 and IES LM-80.
 - 3. LED Estimated Useful Life: Minimum of 50,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

2.03 EMERGENCY LIGHTING UNITS

- A. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
- B. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
- C. Battery:
 - 1. Size battery to supply all connected lamps, including emergency remote heads where indicated.
- D. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
- E. Provide low-voltage disconnect to prevent battery damage from deep discharge.

2.04 EXIT SIGNS

- A. Description: Internally illuminated exit signs with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
 - 1. Number of Faces: Single or double as indicated or as required for the installed location.
 - 2. Directional Arrows: As indicated or as required for the installed location.

2.05 BALLASTS AND DRIVERS

- A. Ballasts/Drivers - General Requirements:
 - 1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
 - 2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.
- B. Dimmable LED Drivers:
 - 1. Dimming Range: Continuous dimming from 100 percent to five percent relative light output unless dimming capability to lower level is indicated, without flicker.
 - 2. Control Compatibility: Fully compatible with the dimming controls to be installed.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of luminaires provided under this section.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Install products in accordance with manufacturer's instructions.
- D. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting) and NECA 502 (industrial lighting).
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
- G. Recessed Luminaires:
 - 1. Install trims tight to mounting surface with no visible light leakage.
- H. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.
- I. Install accessories furnished with each luminaire.
- J. Bond products and metal accessories to branch circuit equipment grounding conductor.
- K. Emergency Lighting Units:
- L. Exit Signs:
- M. Install lamps in each luminaire.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect each product for damage and defects.
- C. Operate each luminaire after installation and connection to verify proper operation.
- D. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.
- E. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.03 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.

END OF SECTION

SECTION 28 4600
FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fire, heat and smoke alarm system design and installation, including all components, wiring, and conduit.

1.02 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 72 - National Fire Alarm and Signaling Code; 2016.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Evidence of designer qualifications.
- C. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
 - 1. Copy (if any) of list of data required by authority having jurisdiction.
 - 2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
 - 3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
 - 4. System zone boundaries and interfaces to fire safety systems.
 - 5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
 - 6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
 - 7. List of all devices on each signaling line circuit, with spare capacity indicated.
 - 8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
 - 9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
 - 10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
 - 11. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.
 - 12. Certification by Contractor that the system design complies with Contract Documents.
- D. Evidence of installer qualifications.
- E. Evidence of instructor qualifications; training lesson plan outline.
- F. Evidence of maintenance contractor qualifications, if different from installer.
- G. Inspection and Test Reports:
 - 1. Submit inspection and test plan prior to closeout demonstration.
 - 2. Submit documentation of satisfactory inspections and tests.
 - 3. Submit NFPA 72 "Inspection and Test Form," filled out.

- H. Operating and Maintenance Data: See Section 01 7800 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
 - 1. Complete set of specified design documents, as approved by authority having jurisdiction.
 - 2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
 - 3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
 - 4. List of recommended spare parts, tools, and instruments for testing.
 - 5. Detailed troubleshooting guide and large scale input/output matrix.
 - 6. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
- I. Project Record Documents: See Section 01 7800 for additional requirements; have one set available during closeout demonstration:
 - 1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
 - 2. "As installed" wiring and schematic diagrams, with final terminal identifications.
 - 3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.
- J. Closeout Documents:
 - 1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
 - 2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.04 QUALITY ASSURANCE

- A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.
- B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
 - 1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
 - 2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
 - 3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.
- C. Maintenance Contractor Qualifications: Same entity as installer or different entity with specified qualifications.
- D. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.

1.05 WARRANTY

- A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.
- B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Fire Alarm Control Units and Accessories - Other Acceptable Manufacturers:
 - 1. Honeywell Security & Fire Solutions/Gamewell-FCI: www.gamewell-fci.com/#sle.

2. Honeywell Security & Fire Solutions/Silent Knight: www.silentknight.com/#sle.
 3. Siemens Building Technologies, Inc: www.usa.siemens.com/#sle.
 4. Provide control units made by the same manufacturer.
- B. Initiating Devices and Notification Appliances:
1. Honeywell Security & Fire Solutions/Gamewell-FCI: www.gamewell-fci.com/#sle.
 2. Honeywell Security & Fire Solutions/Notifier: www.notifier.com/#sle.
 3. Siemens Building Technologies, Inc: www.sbt.siemens.com/#sle.

2.02 FIRE ALARM SYSTEM

- A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
 2. Protected Premises: Entire building shown on drawings.
 3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
 - a. ADA Standards.
 - b. The requirements of the local authority having jurisdiction, which is _____.
 - c. Applicable local codes.
 - d. Contract Documents (drawings and specifications).
 - e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
 4. Evacuation Alarm: Multiple smoke zones; allow for evacuation notification of any individual zone or combination of zones, in addition to general evacuation of entire premises.
 5. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.
 6. General Evacuation Zones: Each smoke zone is considered a general evacuation zone unless otherwise indicated, with alarm notification in all zones on the same floor, on the floor above, and the floor below.
 7. Program notification zones.
 8. Fire Alarm Control Unit.
- B. Circuits:
1. Initiating Device Circuits (IDC): Class B, Style A.
 2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
 3. Notification Appliance Circuits (NAC): Class B, Style W.
- C. Power Sources:
1. Primary: Dedicated branch circuits of the facility power distribution system.
 2. Secondary: Storage batteries.
 3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.

2.03 FIRE SAFETY SYSTEMS INTERFACES

- A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
- B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:

2.04 COMPONENTS

- A. General:

1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
 2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
- B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.
- C. Master Control Unit: As specified for Basis of Design above, or equivalent.
- D. Initiating Devices:
1. Addressable Systems:
 - a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.
 - b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.
- E. Notification Appliances:
- F. Circuit Conductors: Copper or optical fiber; provide 200 feet (60 m) extra; color code and label.
- G. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.
- H. Locks and Keys: Deliver keys to Owner.
- I. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
 2. Provide one for each control unit where operations are to be performed.
 3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
 4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and Contract Documents.
- B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.
- C. Obtain Owner's approval of locations of devices, before installation.
- D. Install instruction cards and labels.

3.02 INSPECTION AND TESTING FOR COMPLETION

- A. Notify Owner 7 days prior to beginning completion inspections and tests.
- B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.
- C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.
- D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.
- E. Provide all tools, software, and supplies required to accomplish inspection and testing.
- F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.
- G. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.03 OWNER PERSONNEL INSTRUCTION

- A. Provide the following instruction to designated Owner personnel:
 1. Hands-On Instruction: On-site, using operational system.

2. Classroom Instruction: Owner furnished classroom, on-site or at other local facility.
- B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:
 1. Initial Training: 1 session pre-closeout.
- C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:
 1. Initial Training: 1 session pre-closeout.

3.04 CLOSEOUT

- A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
 1. Be prepared to conduct any of the required tests.
 2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
 3. Have authorized technical representative of control unit manufacturer present during demonstration.
 4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
 5. Repeat demonstration until successful.

3.05 MAINTENANCE

- A. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.
- B. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:
 1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
 2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
 3. Record keeping required by NFPA 72 and authorities having jurisdiction.
- C. Provide trouble call-back service upon notification by Owner:
 1. Provide on-site response within 2 hours of notification.
 2. Include allowance for call-back service during normal working hours at no extra cost to Owner.
 3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.
- D. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.
- E. Comply with Owner's requirements for access to facility and security.

END OF SECTION

SECTION 31 1000

SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Clearing and protection of vegetation.
- B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- B. Section 01 5713 - Temporary Erosion and Sediment Control.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products.
- D. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
- E. Section 02 4100 - Demolition: Removal of built elements and utilities.
- F. Section 31 2200 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- G. Section 31 2323 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
- H. Section 31 2323 - Fill: Filling holes, pits, and excavations generated as a result of removal operations.

PART 3 EXECUTION

2.01 SITE CLEARING

- A. Comply with other requirements specified in Section 01 7000.
- B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

2.02 EXISTING UTILITIES AND BUILT ELEMENTS

- A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Protect existing structures and other elements that are not to be removed.

2.03 VEGETATION

- A. Scope: Remove trees, shrubs, brush, and stumps in areas to be covered by building structure, paving, playing fields, lawns, and planting beds.
- B. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
- C. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
 - 1. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches (450 mm).
 - 2. Existing Stumps: Treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches (450 mm).
 - 3. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.

- 4. Fill holes left by removal of stumps and roots, using suitable fill material, with top surface neat in appearance and smooth enough not to constitute a hazard to pedestrians.
- D. Dead Wood: Remove all dead trees (standing or down), limbs, and dry brush on entire site; treat as specified for vegetation removed.
- E. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

2.04 DEBRIS

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

SECTION 31 2200

GRADING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Rough grading the site for site structures.
- B. Finish grading.

1.02 RELATED REQUIREMENTS

- A. Section 31 1000 - Site Clearing.
- B. Section 31 2316 - Excavation.
- C. Section 31 2316.13 - Trenching: Trenching and backfilling for utilities.
- D. Section 31 2323 - Fill: Filling and compaction.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Other Fill Materials: See Section 31 2323.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the Work are as indicated.
- B. Verify the absence of standing or ponding water.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Stake and flag locations of known utilities.
- C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
- D. Notify utility company to remove and relocate utilities.
- E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
- F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

3.03 ROUGH GRADING

- A. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
- B. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
- C. When excavating through roots, perform work by hand and cut roots with sharp axe.
- D. See Section 31 2323 for filling procedures.
- E. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
- F. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 FINISH GRADING

- A. Before Finish Grading:
 - 1. Verify building and trench backfilling have been inspected.
 - 2. Verify subgrade has been contoured and compacted.
- B. Remove debris, roots, branches, stones, in excess of 1/2 inch (13 mm) in size. Remove soil contaminated with petroleum products.
- C. Where topsoil is to be placed, scarify surface to depth of 6 inches (150 mm).

- D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches (75 mm).
- E. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
- F. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.05 TOLERANCES

- A. Top Surface of Subgrade: Plus or minus 0.10 foot (1-3/16 inches) (30 mm) from required elevation.
- B. Top Surface of Finish Grade: Plus or minus 0.04 foot (1/2 inch) (13 mm).

3.06 REPAIR AND RESTORATION

- A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

3.07 FIELD QUALITY CONTROL

- A. See Section 31 2323 for compaction density testing.

3.08 CLEANING

- A. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 31 2316 EXCAVATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Excavating for slabs-on-grade and paving.
- B. Trenching for utilities outside the building to utility main connections.
- C. Temporary excavation support and protection systems.

1.02 RELATED REQUIREMENTS

- A. Document Geotech Evaluation Report T-BUILDING, Pueblo of Santa Ana, New Mexico, Project Number: 444319-5990000.00: Geotechnical report; bore hole locations and findings of subsurface materials.
- B. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- C. Section 31 1000 - Site Clearing: Vegetation and existing debris removal.
- D. Section 31 2200 - Grading: Grading.
- E. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
- F. Section 31 2316.26 - Rock Removal: Removal of rock during excavating.
- G. Section 31 2323 - Fill: Fill materials, backfilling, and compacting.

1.03 REFERENCE STANDARDS

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

PART 2 PRODUCTS

2.01 MATERIALS

- A. Bedding and Fill to Correct Over-Excavation:
 - 1. See Section 31 2323 for bedding and corrective fill materials at general excavations.
 - 2. See Section 31 2316.13 for bedding and corrective fill materials at utility trenches.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that survey bench mark and intended elevations for the work are as indicated.
- B. Survey existing adjacent structures and improvements and establish exact elevations at fixed points to act as benchmarks.

3.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 1000 for clearing, grubbing, and removal of existing debris.
- C. Locate, identify, and protect utilities that remain and protect from damage.
- D. Notify utility company to remove and relocate utilities.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- F. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Architect.

3.03 TEMPORARY EXCAVATION SUPPORT AND PROTECTION

- A. Excavation Safety: Comply with OSHA's Excavation Standard, 29 CFR 1926, Subpart P.

3.04 EXCAVATING

- A. Excavate to accommodate new structures and construction operations.
 - 1. Excavate to the specified elevations.
- B. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- C. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard (0.25 cu m) measured by volume. See Section 31 2316.26 for removal of larger material.

3.05 SUBGRADE PREPARATION

- A. See Section 31 2323 for subgrade preparation at general excavations.
- B. See Section 31 2316.13 for subgrade preparation at utility trenches.

3.06 FILLING AND BACKFILLING

- A. Do not fill or backfill until all debris, water, unsatisfactory soil materials, obstructions, and deleterious materials have been removed from excavation.
- B. See Section 31 2323 for fill, backfill, and compaction requirements at general excavations.
- C. See Section 31 2200 for rough and final grading and topsoil replacement requirements.

3.07 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Provide for visual inspection of load-bearing excavated surfaces by Architect before placement of foundations.

3.08 CLEANING

- A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 2200.
- B. Remove excavated material that is unsuitable for re-use from site.
- C. Remove excess excavated material from site.

3.09 PROTECTION

- A. Divert surface flow from rains or water discharges from the excavation.
- B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.
- C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.
- D. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.
- E. Keep excavations free of standing water and completely free of water during concrete placement.

END OF SECTION

SECTION 31 2316.13

TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Backfilling and compacting for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

- A. Document T-BUILDING, Pueblo of Santa Ana, New Mexico, Project Number: 444319-5990000.00: Geotechnical report; bore hole locations and findings of subsurface materials.
- B. Section 31 2200 - Grading: Site grading.
- C. Section 31 2316 - Excavation: Building and foundation excavating.
- D. Section 31 2323 - Fill: Backfilling at building and foundations.

1.03 DEFINITIONS

- A. Finish Grade Elevations: Indicated on drawings.

1.04 REFERENCE STANDARDS

- A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18 in.) Drop; 2017.
- B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)); 2012, with Editorial Revision (2015).
- C. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method; 2015, with Editorial Revision (2016).
- D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)); 2012, with Editorial Revision (2015).
- E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2015.
- F. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2017.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. When fill materials need to be stored on site, locate stockpiles where indicated.
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.

2.02 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Locate, identify, and protect utilities that remain and protect from damage.
- D. Notify utility company to remove and relocate utilities.
- E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

- F. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Architect.

2.03 TRENCHING

- A. Notify Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.
- B. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.
- C. Do not interfere with 45 degree bearing splay of foundations.
- D. Cut trenches wide enough to allow inspection of installed utilities.
- E. Hand trim excavations. Remove loose matter.
- F. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.
- G. Remove lumped subsoil, boulders, and rock up to 1/3 cubic yard (0.25 cu m) measured by volume. See Section 31 2316.26 for removal of larger material.
- H. Remove excavated material that is unsuitable for re-use from site.
- I. Remove excess excavated material from site.
- J. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.
- K. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot (305 mm) into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Architect.

2.04 PREPARATION FOR UTILITY PLACEMENT

- A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

2.05 BACKFILLING

- A. Backfill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 feet (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
 - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated:
- H. Reshape and re-compact fills subjected to vehicular traffic.

2.06 BEDDING AND FILL AT SPECIFIC LOCATIONS

2.07 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.
- B. Perform compaction density testing on compacted fill in accordance with ASTM D1556/D1556M, ASTM D2167, or ASTM D6938.

- C. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").
- D. If tests indicate work does not meet specified requirements, remove work, replace and retest.

END OF SECTION

SECTION 31 2323

FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Filling, backfilling, and compacting for slabs-on-grade and site structures.
- B. Backfilling and compacting for utilities outside the building to utility main connections.
- C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

- A. Document T-BUILDING, Pueblo of Santa Ana, New Mexico, Project Number: 444319-5990000.00: Geotechnical report; bore hole locations and findings of subsurface materials.
- B. Section 01 5713 - Temporary Erosion and Sediment Control: Slope protection and erosion control.
- C. Section 31 2200 - Grading: Site grading.
- D. Section 31 2316.13 - Trenching: Excavating for utility trenches outside the building to utility main connections.
- E. Section 31 2316.26 - Rock Removal: Removal of rock during excavating.
- F. Section 31 3700 - Riprap.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Identify required lines, levels, contours, and datum locations.
- B. See Section 31 2200 for additional requirements.
- C. Verify areas to be filled are not compromised with surface or ground water.

2.02 PREPARATION

- A. Scarify and proof roll subgrade surface to a depth of 6 inches (150 mm) to identify soft spots.
- B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
- C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.
- D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

2.03 FILLING

- A. Fill to contours and elevations indicated using unfrozen materials.
- B. Employ a placement method that does not disturb or damage other work.
- C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
- D. Maintain optimum moisture content of fill materials to attain required compaction density.
- E. Slope grade away from building minimum 2 inches in 10 feet (50 mm in 3 m), unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
- F. Correct areas that are over-excavated.
 - 1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
- G. Compaction Density Unless Otherwise Specified or Indicated:
- H. Reshape and re-compact fills subjected to vehicular traffic.

- I. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

2.04 FILL AT SPECIFIC LOCATIONS

- A. Use general fill unless otherwise specified or indicated.

END OF SECTION

SECTION 32 1123
AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Aggregate base course.
- B. Paving aggregates.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for base course.
- B. Section 31 2323 - Fill: Compacted fill under base course.
- C. Section 32 1216 - Asphalt Paving: Finish and binder asphalt courses.
- D. Section 32 1313 - Concrete Paving: Finish concrete surface course.

1.03 SUBMITTALS

- A. Materials Sources: Submit name of imported materials source.
- B. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.
- C. Compaction Density Test Reports.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. When necessary, store materials on site in advance of need.
- B. Aggregate Storage, General:
 - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
 - 2. Prevent contamination.
 - 3. Protect stockpiles from erosion and deterioration of materials.

PART 3 EXECUTION

2.01 EXAMINATION

- A. Verify that survey bench marks and intended elevations for the work are as indicated.
- B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

2.02 PREPARATION

- A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.
- B. Do not place aggregate on soft, muddy, or frozen surfaces.

2.03 INSTALLATION

- A. Place aggregate in maximum 6" (____ mm) layers and roller compact to specified density.
- B. Level and contour surfaces to elevations and gradients indicated.
- C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.
- D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

2.04 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch (6.4 mm) measured with 10 foot (3 m) straight edge.
- B. Scheduled Compacted Thickness: Within 1/4 inch (6.4 mm).

2.05 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection and testing.

SECTION 32 1313
CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Concrete sidewalks, stair steps, gutters, and parking areas.

1.02 RELATED REQUIREMENTS

- A. Section 31 2200 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.
- B. Section 32 1726 - Tactile Warning Surfacing: Plastic tactile and detectable warning tiles for pedestrian walking surfaces.

1.03 REFERENCE STANDARDS

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete; 2016.
- C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).
- D. ACI 305R - Guide to Hot Weather Concreting; 2010.
- E. ACI 306R - Guide to Cold Weather Concreting; 2016.
- F. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).
- G. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2017a.
- H. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.
- I. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method; 2016.
- J. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).
- K. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.
- L. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2017.
- M. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004, with Editorial Revision (2013).
- N. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2013).
- O. Standard Specifications for Highway and Bridge Construction NMDOT 2014 Edition

1.04 SUBMITTALS

- A. Product Data: Provide data on joint filler, admixtures, and curing compound.
- B. Approved NMDOT Mix Designs for each type of concrete
- C. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

PART 2 PRODUCTS

2.01 FORM MATERIALS

- A. Form Materials: As specified in Section 03 1000, conform to ACI 301.
- B. Wood form material, profiled to suit conditions.

- C. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).

- 1. Thickness: 1/2 inch (12 mm).

2.02 REINFORCEMENT

- A. Reinforcing Steel per NMDOT Requirements

2.03 CONCRETE MATERIALS

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: Provide in accordance with State of New Mexico Highways standards. Section 509.

2.04 ACCESSORIES

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

- A. Prepare subbase in accordance with State of New Mexico Highways standards.

3.03 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.04 FORMING

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

- A. Place reinforcement as indicated.

3.06 COLD AND HOT WEATHER CONCRETING

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F (4 degrees C), or surface is wet or frozen.

3.07 PLACING CONCRETE

- A. Place concrete in accordance with State of New Mexico Highways standards.
- B. Ensure reinforcement, inserts, embedded parts, formed joints and ____ are not disturbed during concrete placement.

3.08 JOINTS

- A. Align curb, gutter, and sidewalk joints.
- B. Place 1/2 inch (____ mm) wide expansion joints at 25 foot (____ m) intervals and to separate paving from vertical surfaces and other components and in pattern indicated.
 - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch (13 mm) of finished surface.
 - 2. Secure to resist movement by wet concrete.
- C. Provide scored joints.
 - 1. At 5 feet (____ m) intervals.