

# Specifications

## WILLCOX UNIFIED SCHOOL DISTRICT

### WRESTLING ROOM REMODELING & ADDITION



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240 N. Bisbee Rd, Willcox AZ 85643

SWAIM PROJECT #2404.03

**DATE: November 20, 2025**



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**& WRESTLING ROOM ADDITION**

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# Invitation for Bid

**INVITATION FOR BID#:** 04-2025-02

**MATERIAL OR SERVICE:** Willcox High School Wrestling Room Remodeling & Addition

**DUE DATE AND TIME:** Thursday, December 18, 2025, at 2:00 p.m., Arizona Time

**OPENING LOCATION:** Willcox School District Administration  
480 N. Bisbee Ave  
Willcox, AZ 85643

**PRE-BID CONFERENCE LOCATION:** TBD

**SUBSTITUTION REQUESTS, DUE BY EMAIL:** No later than December 9, 2025, at 3:00 p.m., Arizona Time

In accordance with School District Procurement Rules in the Arizona Administrative Code (A.A.C.) promulgated by the State Board of Education pursuant to A.R.S. 15-213, bids for the material or services specified will be received by Swaim Associates, at the above specified location, until the time and date cited. Bids received by the correct time and date shall be opened and the Offeror's submitting shall be publicly read. All other information contained in the bid shall remain confidential until award is made. **If you need directions to our office**, please call **(520) 384-8600**. The Invitation for Bid and all Amendment(s) will be posted to [www.azpurchasing.org](http://www.azpurchasing.org). It is the Offeror's responsibility to check for and acknowledge Amendments.

**Three (3) sets of the bid package are requested:** one marked "**Original**", one marked "**Copy**", and one electronic copy on a **USB**. Bids shall be in the actual possession of the District, at the location indicated, on or prior to the exact time and date indicated above. Late bids shall not be considered. Bids must be submitted in a sealed envelope with the solicitation number and Offeror's name and address clearly indicated on the package. All bids must be written legibly in ink or typewritten. Additional instructions for preparing a bid are provided herein.

**VENDORS ARE STRONGLY ENCOURAGED TO CAREFULLY READ THE ENTIRE INVITATION FOR BID.**

Questions regarding this Invitation for Bid should be directed to:  
**Mark Bollard**  
Email: [mbollard@swaimaia.com](mailto:mbollard@swaimaia.com)

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**DOCUMENTS REFERENCED**

You may access a copy of the documents referenced within this bid at the following web addresses:

**Arizona Revised Statutes (A.R.S.) is available at:** <http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp>.

**The Arizona School District Procurement Rules in the Arizona Administrative Code is available at:**  
[http://azsos.gov/public\\_services/Title\\_07/7-02.htm#Article\\_10](http://azsos.gov/public_services/Title_07/7-02.htm#Article_10).

**I.R.S. W-9 Form (Request for Taxpayer I.D. Number) is available at:** <http://www.irs.gov/pub/irs-pdf/iw9.pdf>.

## UNIFORM INSTRUCTIONS TO OFFERORS

### 1. Definition of Terms

As used in these instructions, the terms listed below are defined as follows:

- A. **“Attachment”** means any item the Solicitation requires an Offeror to submit as part of the Offer.
- B. **“Contract”** means the combination of the Solicitation, including the uniform and Special Instructions to Offerors, the Uniform and Special Terms and Conditions, and the Specifications and Statement of Scope of Work; the Offer and any Best and Final Offers; and any Solicitation Amendments (Addenda) or Contract Amendments; and any terms applied by law.
- C. **“Contract Amendment”** means a written document signed by the Procurement Officer that is issued for the purpose of making changes in the Contract.
- D. **“Contractor”** means any person who has a contract with the School District.
- E. **“Days”** means calendar days unless otherwise specified.
- F. **“Exhibit”** means any item labeled as an Exhibit in the Solicitation or placed in the Exhibits section of the solicitation.
- G. **“Gratuity”** means a payment, loan, subscription, advance, deposit of money, services, or anything of more than nominal value present or promised, unless consideration of substantially equal or greater value is received.
- H. **“Offer”** means bid, proposal or quotation.
- I. **“Offeror”** means a vendor who responds to a Solicitation.
- J. **“Procurement Officer”** means the person duly authorized to enter into and administer Contracts and make written determinations with respect to the Contract or his or her designee.
- K. **“Responsible Offeror”** means the Offeror who has the capability to perform the contract requirements and the integrity and reliability to assure complete and good faith performance and who submits the lowest bid.
- L. **“Responsive Offeror”** means the Offeror who submits a bid that conforms in all material respects to this Invitation for Bid, Instruction to Offeror and the Plans and Specifications which are incorporated herein by this reference.
- M. **“Solicitation”** means an Invitation for Bids (IFB), a Request for Proposals (RFP), or a Request for Quotations (RFQ).
- N. **“Solicitation Amendment (or Addendum)”** means a written document that is authorized by the Procurement Officer and issued for the purpose of making changes to the Solicitation.
- O. **“Subcontract”** means any Contract, express or implied, between the Contractor and another party or between a subcontractor and another party delegating or assigning, in whole or in part, the making or furnishings of any material or any service required for the performance of the Contract.
- P. **“School District”** means the School District that executes the contract.

### 2. Inquiries

A. Duty to Examine. It is the responsibility of each Offeror to examine the entire Solicitation, seek clarification in writing, and check its Offer for accuracy before submitting the Offer. Lack of care in preparing an Offer shall not be grounds for withdrawing the Offer after the Offer due date and time nor shall it give rise to any Contract claim.

B. Solicitation Contact Person. Any inquiry related to a Solicitation, including any requests for or inquiries regarding standards referenced in the Solicitation shall be directed solely to the Solicitation contact person. The Offeror shall not contact or direct inquiries concerning this Solicitation to any other employee unless the Solicitation specifically identifies a person other than the Solicitation contact person as a contact.

C. Submission of Inquiries. The Procurement Officer or the person identified in the Solicitation as the contact for inquiries may require that an inquiry be submitted in writing. Any inquiry related to a Solicitation shall refer to the appropriate Solicitation number, page, and paragraph. Do not place the Solicitation number on the outside of the envelope containing that inquiry since it may then be identified as an Offer and not be opened until after the Offer due date and time.

D. Timeliness. Any inquiry shall be submitted as soon as possible and at least seven (7) days before the Offer due date and time. Failure to do so may result in the inquiry not being answered.

E. No Right to Rely on Verbal Responses. Any inquiry that results in changes to the Solicitation shall be answered solely through a written Solicitation Amendment or Addendum. An Offeror may not rely on verbal responses to inquiries.

F. Solicitation Amendments/Addenda. The Solicitation shall only be modified by a Solicitation Amendment or Addendum.

G. Pre-Offer Conference. If a pre-offer conference has been scheduled under this Solicitation, the date, time, and location appear on the Solicitation cover sheet or elsewhere in the Solicitation. An Offeror should raise any questions it may have about the Solicitation or the procurement at that time. An Offeror may not rely on any verbal responses to questions at the conference. Material issues raised at the conference that result in changes to the Solicitation shall be answered solely through a written Solicitation Amendment or Addendum.

H. Persons with Disabilities. Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contacting the appropriate Solicitation contact person. Requests shall be made as early as possible to allow time to arrange the accommodation.

### **3. Offer Preparation**

A. Forms: No Facsimile or Electronic Offers. An Offer shall be submitted either on the forms provided in this Solicitation or their substantial equivalent. Any substitute document for the forms provided in this Solicitation will be legible and contain the same information requested on the form. A facsimile, electronic or mailgram offer shall be rejected.

B. Typed or Ink; Corrections. The Offer must be typed or in ink. Erasures, interlineations or other modifications in the Offer must be initialed in ink by the person signing the Offer. Modifications shall not be permitted after Offers have been opened except as otherwise provided under applicable law.

C. Evidence of Intent to be Bound. The Offer and Acceptance form within the Solicitation must be submitted with the Offer and must include a signature by a person authorized to sign the Offer. The signature shall signify the Offeror's intent to be bound by the Offer and the terms of the Solicitation and that the information provided is true, accurate, and complete. Failure to submit verifiable evidence of intent to be bound, such as an original signature, may result in rejection of the Offer.

D. Exceptions to Terms and Conditions. All exceptions included with the Offer shall be submitted in a clearly identified separate section of the Offer in which the Offeror clearly identifies the specific paragraphs of the Solicitation where the exceptions occur. Any exceptions not included in such a section shall be without force and effect in any resulting Contract unless such exception is specifically referenced by the Procurement Officer in a written statement. The Offeror's preprinted or standard terms will not be considered as a part of any resulting Contract.

E. Subcontracts. Offeror shall clearly list any proposed subcontractors and the subcontractor's proposed responsibilities in the Offer.

F. Cost of Offer Preparation. The District will not reimburse any Offeror the cost of responding to a Solicitation.

G. Solicitation Amendments/Addenda. Unless otherwise stated in the Solicitation, each Solicitation Amendment or Addendum shall be signed with an original signature by the person signing the Offer, and shall be submitted no later than the Offer due date and time. Failure to return a signed copy of a material Solicitation Amendment or Addendum or to follow the instructions for acknowledgement of the Solicitation Amendment/Addendum may result in rejection of the Offer.

H. Federal Excise Tax. School Districts are exempt from Federal Excise Tax on manufactured goods. Exemption Certificates will be prepared upon request.

I. Provision of Tax Identification Numbers. Offerors are required to provide their Arizona Transaction Privilege Tax number and/or Federal Employer Identification number, if applicable, in the space provided on the Offer and Acceptance Form and provide the tax rate and amount, if applicable, on the Cost Form.

J. Identification of Taxes in Offer. School Districts are subject to all applicable state and local transaction privilege taxes. If Arizona resident Offerors do not indicate taxes on a separate item in the Offer, the School District will conclude that the price(s) offered includes all applicable taxes.

K. Disclosure. If the Firm, business, or person submitting this Offer has been debarred, suspended, or otherwise lawfully precluded from participating in any public procurement activity, including being disapproved as a subcontractor with any federal, state, or local government, or if any such preclusion from participation from any public procurement activity is currently pending, the Offeror must fully explain the circumstances relating to the preclusion or proposed preclusion in the Offer. The Offeror shall include a letter with its Offer setting forth the name and address of the governmental unit, the effective date of this suspension or debarment, the duration of the suspension or debarment, and the relevant circumstances relating the suspension or debarment. If suspension or debarment is currently pending, a detailed description of all relevant circumstances including the details enumerated above must be provided.

L. Solicitation Order of Precedence. In the event of a conflict in the provisions of this Solicitation, the following shall prevail in the order set forth below:

1. Addenda/Amendments;
2. Special Terms and Conditions;
3. Uniform General Terms and Conditions;
4. Statement of Scope of Work;
5. Specifications;
6. Attachments;
7. Exhibits;
8. Special Instructions to Offerors; and
9. Uniform Instructions to Offerors

M. Delivery. Unless stated otherwise in the Solicitation, all prices shall be F.O.B. Destination and shall include all delivery and unloading at the destination(s).

#### **4. Submission of Offer**

A. Sealed Envelope or Package. Each Offer shall be submitted to the submittal location identified in this Solicitation, in a sealed envelope or package that identifies its contents as an Offer and the Solicitation number to which it responds. The appropriate Solicitation number shall be plainly marked on the outside of the envelope or package.

B. Offer Amendment or Withdrawal. An Offer may not be amended or withdrawn after the Offer due date and time except as otherwise provided under applicable law.

C. Public Record. Under applicable law, all Offers submitted and opened are public records and must be retained by the School District. Offers shall be open to public inspection after Contract award, except for such Offers deemed to be confidential by the School District. If an Offeror believes that information in its Offer should remain confidential, it shall stamp as confidential that information and submit a statement with its Offer detailing the reasons that information should not be disclosed. The School District shall make a determination on whether the stamped information is confidential pursuant to the School District's Procurement Code.

D. Non-collusion, Employment, and Services. By signing the Offer and Acceptance form and notarization the non-collusion affidavit or other official contract form, the Offeror certifies that:

1. It did not engage in collusion or other anti-competitive practices in connection with the preparation or submission of its offer; and
2. It does not discriminate against any employee, applicant for employment, or person to whom it provides services because of race, color, religion, sex, national origin, or disability, and that it complies with all applicable federal, state, and local laws and executive orders regarding employment.

## 5. Additional Bid Information

A. Unit Price Prevails. Where applicable, in the case of discrepancy between the unit price or rate and the extension of that unit price or rate, the unit price or rate shall govern.

B. Late Offers. An offer submitted after the exact Offer due date and exact time shall be rejected.

C. Disqualification. The Offer of an Offeror who is currently debarred, suspended or otherwise lawfully prohibited from any public procurement activity may be rejected.

D. Offer Acceptance Period. An Offeror submitting an Offer under this Solicitation shall hold its Offer open for the number of days from the Offer due date that is stated in the Solicitation. If the Solicitation does not specifically state a number of days for the Offer acceptance, the number of days shall be ninety (90).

E. Payment. Payments shall comply with the requirements of A.R.S. Titles 35 and 41, Net 30 days. Upon receipt and acceptance of goods or services, the Contractor shall submit a complete and accurate invoice for payment within thirty (30) days.

F. Waiver and Rejection Rights. Notwithstanding any other provision of the solicitation, the School District reserves the right to:

1. Waive any minor informality;
2. Reject any and all offers or portions thereof; or
3. Cancel a solicitation.

## 6. Award

A. Number or Types of Awards. Where applicable, the School District reserves the right to make multiple awards or to award a Contract by individual line items, by a group of line items, or to make an aggregate award, whichever is deemed most advantageous to the School District. If the Procurement Officer determines that an aggregate award to one Offeror is not in the School District's interest, "all or none" Offers shall be rejected.

B. Contract Inception. An Offer does not constitute a Contract nor does it confer any rights on the Offeror to the award of a Contract. A Contract is not created until the Offer is accepted in writing by an authorized District Representative of

the Offer and Acceptance Form. A letter or other notice of award or of the intent to award shall not constitute acceptance of the Offer.

C. Effective Date. The effective date of this Contract shall be the date that the authorized District Representative signs the Offer and Acceptance Form or other official contract form, unless another date is specifically stated in the Contract.

D. Final acceptance. The final acceptance will be contingent upon the approval of the Governing Board.

## **7. Protests**

A protest shall comply with and be resolved according to Arizona Department of Education School District Procurement Code Rule A.A.C. R7-2-1141 through R7-2-1153. Protests shall be in writing and be filed with the District Representative, Calvin Baker, Superintendent. A protest of a Solicitation shall be received by the District Representative before the Offer due date. A protest of a proposed award or of an award shall be filed with the Procurement Officer within ten (10) days after the protester knows or should have known the basis of the protest. A protest shall include:

- A. The name, addresses, and telephone number of the protester;
- B. The signature of the protester or its representative;
- C. Identification of the purchasing agency and the Solicitation or Contract number;
- D. A detailed statement of the legal and factual grounds of the protest including copies of relevant documents; and
- E. The form of relief requested.

## UNIFORM GENERAL TERMS AND CONDITIONS

### 1. Contract Interpretation

- A. Arizona Law. The law of Arizona applies to this Contract including, where applicable, the Uniform Commercial Code as adopted by the State of Arizona and the Arizona School District Procurement Code, Arizona Revised Statutes (A.R.S.) 15-213, and its implementing rules, Arizona Administrative Code (A.A.C.) Title 7, Chapter 2, Articles 10 and 11.
- B. Implied Contract Terms. Each Provision of law and any terms required by law to be in this Contract are a part of this Contract as if fully stated in it.
- C. Relationship of Parties. The Contractor under this Contract is an independent Contractor. Neither party to this Contract shall be deemed to be the employee agent of the other party to the Contract.
- D. Severability. The provisions of this Contract are severable. Any term or condition deemed illegal or invalid shall not affect any other term or condition of the Contract.
- E. No Parol Evidence. This Contract is intended by the parties as a final and complete expression of their agreement. No course of prior dealings between the parties and no usage of the trade shall supplement or explain any terms used in this document.
- F. No Waiver. Either party's failure to insist on strict performance of any term or condition of the Contract shall not be deemed waiver of that term or condition even if the party accepting or acquiescing in the nonconforming performance knows of the nature of the performance and fails to object to it.

### 2. Contract Administration and Operation

- A. Records. Under A.R.S. § 35-214 and § 35-215, the Contractor shall retain and shall Contractually require each Subcontractor to retain all data and other records ("records") relating to the acquisition and performance of the Contract for a period of five years. After the completion of the Contract. All records shall be subject to inspection and audit at reasonable times. Upon request, the Contractor shall produce a legible copy of any or all such records.
- B. Non-Discrimination. The Contractor shall comply with State Executive Order No. 99-4, 2000-4 and all other applicable Federal and State laws, rules and regulations, including the Americans with Disabilities Act.
- C. Audit. At any time during the term of this Contract and five (5) years. Thereafter, the Contractor's or any Subcontractor's books and records shall be subject to audit by the School District and, where applicable, the Federal Government, the extent that the books and records relate to the performance of the Contract or Subcontract.
- D. Inspection and Testing. The Contractor agrees to permit access to its facilities, Subcontractor facilities and the Contractor's processes for producing the materials, at reasonable time for inspection of the materials and services covered under this Contract. The School District shall also have the right to test at its own cost the materials to be supplied under this Contract. Neither inspection at the Contractor's facilities nor testing shall constitute final acceptance of the materials. If the School District determines non-compliance of the materials, the Contractor shall be responsible for the payment of all costs incurred by the School District for testing and inspection.
- E. Notices. Notices to the Contractor required by this Contract shall be made by the School District to the person indicated on the Offer and Acceptance form submitted by the Contractor unless otherwise stated in the Contract. Notices to the School District required by the Contract shall be made by the Contractor to the Solicitation Contact Person indicated on the Solicitation cover sheet, unless otherwise stated in the Contract. An authorized Procurement Officer and an authorized Contractor representative may change their respective person to whom notices shall be given by written notice and an Amendment to the Contract shall not be necessary.

F. Advertising and Promotion of Contract. The Contractor shall not advertise or publish information for commercial benefit concerning this Contract without the prior written approval of the Procurement Officer.

G. Property of the School District. Any materials, including reports, computer programs and other deliverables, created under this Contract are the sole property of the School District. The Contractor is not entitled to a patent or copyright on those materials and may not transfer the patent or copyright to anyone else. The Contractor shall not use or release these materials without the prior written consent of the School District.

### 3. Costs and Payments

A. Payments. Payments shall comply with the requirements of A.R.S. Titles 35 and 41, Net 30 days. Upon receipt and acceptance of goods or services, the Contractor shall submit a complete and accurate invoice for payment from the School District within thirty (30) days. The Purchase Order number must be referenced on the invoice.

#### B. Applicable Taxes.

1. Payment of Taxes by the School District. The School District will pay only the rate and/or amount of taxes identified in the Offer and in any resulting Contract/Purchase Order.

2. State and Local Transaction Privilege Taxes. The School District is subject to all applicable state and local transaction privilege taxes. Transaction privilege taxes apply to the sale and are the responsibility of the seller to remit. Failure to collect taxes from the buyer does not relieve the seller from its obligation to remit taxes.

3. Tax Indemnification. Contractor and all Subcontractors shall pay all federal, state, and local taxes applicable to its operation and any persons employed by the Contractor. Contractor shall, and require all Subcontractors to hold the School District harmless from any responsibility for taxes, damages and interest, if applicable, contributions required under federal, and/or state and local laws and regulations and any other costs including transaction privilege taxes, unemployment compensation insurance, Social Security and Worker's Compensation.

4. IRS W-9. In order to receive payment under any resulting Contract, Contractor shall have a current I.R.S. W-9 Form on file with the School District.

C. Availability of Funds for the Next Fiscal Year. Funds may not presently be available for performance under this Contract beyond the current fiscal year. No legal liability on the part of the School District for any payment may arise under this Contract beyond the current fiscal year until funds are made available for performance of the Contract. The School District will make reasonable efforts to secure such funds.

### 4. Contract Changes

A. Amendments. This Contract is issued under the authority of the Procurement Officer who signed this Contract. The Contract may be modified only through a Contract Amendment within the scope of the Contract signed by the Procurement Officer. Changes to the Contract, including the addition of work or materials, the revision of payment terms, or the substitution of work or materials, directed by an unauthorized employee or made unilaterally by the Contractor are violations of the Contract and or applicable law. Such changes, including unauthorized written Contract Amendments, shall be void and without effect, and the Contractor shall not be entitled to any claim and this Contract based on those changes.

B. Subcontracts. The Contractor shall not enter into any Subcontract under this Contract without the advance written approval of the Procurement Officer. The Subcontract shall incorporate by reference the terms and conditions of this Contract.

C. Assignment and Delegation. The Contractor shall not assign any right nor delegate any duty under this Contract without the prior written approval of the Authorized District Representative.

## 5. Risk and Liability

A. Risk of Loss. The Contractor shall bear all loss of conforming material covered under this Contract until received by authorized personnel at the location designated in the purchase order or Contract. Mere receipt does not constitute final acceptance. The risk of loss for nonconforming materials shall remain with the Contractor regardless of receipt.

B. General Indemnification. Any contract entered by the District shall include the following indemnification language.

"Contractor shall indemnify, defend, save and hold harmless Willcox Unified School District No. 20 and its officers, officials, agents, and employees (hereinafter referred to as "Indemnitee") from and against any and all claims, actions, liabilities, damages, losses, or expenses (including court costs, attorneys' fees, and costs of claim processing, investigation and litigation) (hereinafter referred to as "Claims") for bodily injury or personal injury (including death), or loss or damage to tangible or intangible property caused, or alleged to be caused, in whole or in part, by the negligent or willful acts or omissions of Contractor or any of its Districts, officers, directors, agents, employees or subcontractors. This indemnity includes any claim or amount arising out of or recovered under the Workers' Compensation Law or arising out of the failure of such Contractor to conform to any federal, state or local law, statute, ordinance, rule, regulation or court decree. It is the specific intention of the parties that the Indemnitee shall, in all instances, except for Claims arising solely from the negligent or willful acts or omissions of the Indemnitee, be indemnified by Contractor from and against any and all claims. It is agreed that Contractor will be responsible for primary loss investigation, defense and judgment costs where this indemnification is applicable. In consideration of the award of this contract, the Contractor agrees to waive all rights of subrogation against the District, its officers, officials, agents and employees for losses arising from the work performed by the Contractor for the District."

C. Indemnification - Patent and Copyright. To the extent permitted by law, the Contractor shall defend, indemnify and hold harmless the School District against any liability, including costs and expenses, for infringement of any patent, trademark, or copyright arising out of Contract performance or use by the School District of materials furnished or work performed under this Contract. The School District shall reasonably notify the Contractor of any claim for which it may be liable under this paragraph.

D. Force Majeure.

1. Except for payment of sums due, neither party shall be liable to the other nor deemed in default under this Contract if and to the extent that such party's performance of this Contract is prevented by reason of force majeure. The term "*force majeure*" means an occurrence that is beyond the control of the party affected and occurs without its fault or negligence. Without limiting the foregoing, force majeure includes acts of God; acts of the public enemy; war; riots; strikes; mobilization; labor disputes; civil disorders; fire; flood; lockouts; injections-intervention acts; or failures or refusals to act by government authority; and other similar occurrences beyond the control of the party declaring force majeure which such party is unable to prevent by exercising reasonable diligence.

2. Force Majeure shall not include the following occurrences:

- a) Late delivery of equipment or materials caused by congestion at a manufacturer's plant or elsewhere, or an oversold condition of the market; or
- b) Late performance by a Subcontractor unless the delay arises out of a force majeure occurrence in accordance with this force majeure term and condition; or
- c) Inability of either the Contractor or any Subcontractor to acquire or maintain any required insurance, bonds, licenses, or permits.

3. If either party is delayed at any time in the progress of the work by force majeure, the delayed party shall notify the other party in writing of such delay, as soon as is practicable and no later than the following working day, of the commencement thereof and shall specify the causes of such delay in such notice. Such notice shall be delivered or mailed certified-return receipt requested, and shall make a specific reference to this article, thereby invoking its provisions. The delayed party shall cause such delay to cease as soon as practicable and shall notify the other party in

writing when it has done so. The time of completion shall be extended by Contract Amendment for a period of time equal to the time that results or effects of such delay prevent the delayed party from performing in accordance with this Contract.

4. Any delay or failure in performance by either party hereto shall not constitute default hereunder or give rise to any claim for damages or loss of anticipated profits if, and to the extent that such delay or failure is caused by force majeure.

E. Third Party Antitrust Violations. The Contractor assigns to the School District any claim for overcharges resulting from antitrust violation the extent that those violations concern materials of services supplied by third parties to the Contractor toward fulfillment of this Contract.

## 6. Warranties

A. Liens. The Contractor warrants that the materials supplied under this Contract are free of liens.

B. Quality. Unless otherwise modified elsewhere in these terms and conditions, the Contractor warrants that for one year after acceptance by the School District of the materials or services, they shall be:

1. of a quality to pass without objection in the trade under the Contract description;
2. fit for the intended purposes for which the materials or services are used;
3. within the variations permitted by the Contract and are of even kind, quality, and quality within each unit and among all units;
4. adequately contained, packaged and marked as the Contract may require; and
5. conform to the written promises or affirmations of fact made by the Contractor.

C. Fitness. The Contractor warrants that any material or service supplied to the School District shall fully conform to all requirements of the Solicitation and all representations of the Contractor, and shall be fit for all purposes and uses required by the Contract.

D. Inspection/Testing. The warranties set forth in subparagraphs A through C of this paragraph are not affected by inspection testing of or payment for the materials or services by the School District.

E. Exclusions. Except as otherwise set forth in this Contract, there are no express or implied warranties or merchant ability fitness.

F. Compliance with Applicable Laws. The materials and services supplied under this Contract shall comply with all applicable federal, state and local laws, and the Contract shall maintain all applicable licenses and permits.

G. Survival of Rights and Obligations after Contract Expiration or Termination.

1. Contractor's Representations and Warranties. All representations and warranties made by the Contractor under this Contract shall survive the expiration of termination hereof. In addition, the parties hereto acknowledge that pursuant to A.R.S. § 12-510, except as provided in A.R.S. § 12-529, the School District is not subject to or barred by any limitations of actions prescribed in A.R.S. Title 12, Chapter 5.

2. Purchase Orders. The Contractor shall, in accordance with all terms and conditions of the Contract, fully perform and shall be obligated to comply with all purchase orders received by the Contractor prior to the expiration or termination hereof, unless otherwise directed in writing by the Procurement Offices, including, without limitation, all purchase orders received prior to but not fully performed and satisfied at the expiration or termination of this Contract.

## 7. School District's Contractual Remedies

A. Right to Assurance. If the School District in good faith has reason to believe that the Contractor does not intend to, or is unable to perform or continue performing the Contract, the Procurement Officer may demand in writing that the Contractor give a written assurance of intent or ability to perform. Failure by the Contractor to provide written assurance within the number of days specified in the demand may, at the School District's option, be the basis for terminating the Contract under the Uniform General Terms and Conditions.

### B. Stop Work Order.

1. The School District may, at any time, by written order to the Contractor, require the Contractor to stop all or any part, of the work called for by this Contract for a period of up to ninety (90) days after the order is delivered to the Contractor, and for any further period to which the parties may agree. The order shall be specifically identified as a stop work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage.

2. If a stop work order issued under this clause is canceled or the period of the order or any extension expires, the Contractor shall resume work. The Procurement Officer shall make an equitable adjustment in the delivery schedule or Contract price, or both, and the Contract shall be amended in writing accordingly.

C. Non-exclusive Remedies. The rights and the remedies of the School District under this Contract are not exclusive.

D. Nonconforming Tender. Materials supplied under this Contract shall fully comply with the Contract. The delivery of materials or a portion of the materials in an installment that do not fully comply constitutes a breach of Contract. On delivery of nonconforming materials, the School District may terminate the Contract for default under applicable termination clauses in the Contract, exercise any of its remedies under the Uniform Commercial Code, or pursue any other right or remedy available to it.

E. Right to Offset. The School District shall be entitled to offset against any sums due the Contractor, any expenses or costs incurred by the School District or damages assessed by the School District concerning the Contractor's nonconforming performance or failure to perform the Contract, including expenses, costs and damages described in the Uniform General Terms and Conditions.

## 8. Contract Termination

A. Cancellation for Conflict of Interest. Per A.R.S. 38-511 the School District may cancel this Contract within three (3) years after Contract execution without penalty or further obligation if any person significantly involved in initiating, negotiating, securing, drafting, or creating the Contract on behalf of the School District is, or becomes at any time while the Contract or an extension the Contract is in effect, an employee of or a consultant to any other party to this Contract with respect to the subject matter of the Contract. The cancellation shall be effective when the Contractor receives written notice of the cancellation unless the notice specifies a later time.

B. Gratuities. The School District may, by written notice, terminate this Contract, in whole or in part, if the School District determines that employment or gratuity was offered or made by the Contractor or a representative of the Contractor to any officer or employee of the School District for the purpose of influencing the outcome of the procurement or securing the Contract, an Amendment to the Contract, or favorable treatment concerning the Contract,

including the making of any determination or decision about Contract performance. The School District, in addition to any other rights or remedies, shall be entitled to recover exemplary damages in the amount of three (3) times the value of the gratuity offered by the Contractor.

C. Suspension or Debarment. The School District may, by written notice to the Contractor, immediately terminate this Contract if the school District determines that the Contractor has been disbarred, suspended or otherwise lawfully prohibited from participating in any public procurement activity, including but not limited to, being disapproved as a Subcontractor of any public procurement unit or other governmental body.

D. Termination for Convenience. The School District reserves the right to terminate the Contract, in whole or in part at any time, when in the best interests of the School District without penalty recourse. Upon receipt of the written notice, the Contractor shall immediately stop all work, as directed in the notice, notify all Subcontractors of the effective date of the termination and minimize all further costs to the School District. In the event of termination under this paragraph, all documents, data and reports prepared by the Contractor under the Contract shall become the property of and be delivered to the School District. The Contractor shall be entitled to receive just and equitable compensation for work in progress, work completed, and materials accepted before the effective date of the termination. The cost principles and procedures provided in A.A.C. R7-2-1125 shall apply.

E. Termination for Default.

1. In addition to the rights reserved in the Uniform Terms and Conditions, the School District reserves the right to terminate the Contract in whole or in part due to the failure of the Contractor to comply with any term or condition of the Contract, to acquire and maintain all required insurance policies, bonds, licenses and permits, or to make satisfactory progress in performing the Contract. The Procurement Officer shall provide written notice of the termination and the reasons for it to the Contractor.

2. Upon termination under this paragraph, all documents, data and reports prepared by the Contractor under the Contract shall become the property of and be delivered to the School District.

3. The School District may, upon termination of this Contract, procure, on terms and in the manner that it deems appropriate, materials and services to replace those under this Contract. The Contractor shall be liable to the School District for any excess costs incurred by the School District re-procuring the materials or services.

F. Continuation of Performance through Termination. The Contractor shall continue to perform, in accordance with the requirements of the Contract, up to the date of termination, as directed in the termination notice.

## **9. Contract Claims**

All Contract claims and controversies under this Contract shall be resolved according to A.R.S. Title 15-213 and rules adopted thereunder.

## **10. Offshore Performance**

Due to security and identity protection concerns, direct services under any subsequent contract shall be performed within the borders of the United States. Any services that are described in the specifications or scope of work that directly serve the school district(s) or charter school(s) or its clients and may involve access to secure or sensitive data or personal client data or development or modification of software for the State shall be performed within the borders of the United States. Unless specifically stated otherwise in the specifications, this definition does not apply to indirect or “overhead” services, redundant back-up services or services that are incidental to the performance of the contract. This provision applies to work performed by subcontractors at all tiers.

### **11. Contractor's Employment Eligibility**

By entering the contract, contractor warrants compliance with A.R.S. 41-4401, A.R.S. 23-214, the Federal Immigration and Nationality Act (FINA), and all other federal immigration laws and regulations.

The District may request verification of compliance from any contractor or subcontractor performing work under this contract. The District reserves the right to confirm compliance in accordance with applicable laws.

Should the District suspect or find that the contractor or any of its subcontractors are not in compliance, the District may pursue any and all remedies allowed by law, including, but not limited to: suspension of work, termination of the contract for default, and suspension and/or debarment of the contractor. All costs necessary to verify compliance are the responsibility of the contractor.

### **12. Terrorism Country Divestments**

Per A.R.S. 35-392, the District is prohibited from purchasing from a company that is in violation of the Export Administration Act.

### **13. Scrutinized Business Operations**

Per A.R.S. 35-391, the District is prohibited from purchasing from a company with scrutinized business operations in Sudan.

Per A.R.S. 35-393, the District is prohibited from purchasing from a company with scrutinized business operations in Iran.

In accordance with A.R.S. §§ 35-393, the Offeror is not currently engaged in, and agrees for the duration of the contract not to engage in, a boycott of Israel.

### **14. Fingerprint Clearance Cards**

In accordance with A.R.S 15-512(H), a contractor, subcontractor or vendor or any employee of a contractor, subcontractor or vendor who is contracted to provide services on a regular basis at an individual school may be required to obtain a valid fingerprint clearance card pursuant to Title 41, Chapter 12, Article 3.1. An exception to this requirement may be made as authorized in Governing Board policy. Contractor, subcontractors, vendors and their employees shall not provide services on school district properties until authorized by the District. Additionally, contractor shall comply with Governing Board Policies of the Bisbee School District.

### **15. Registered Sex Offender Notification Restriction**

Contractor represents and warrants that no employee of the Contractor, or of its subcontractor, who has been adjudicated to be a registered sex offender will perform work on District's premises at any time without written approval of the District Representative.

Any breach of Contractor's or any subcontractor's warranty shall be deemed to be a material breach of this Contract, subjecting Contractor to penalties up to and including suspension or termination of this Contract. If the breach is by a subcontractor, and the subcontract is suspended or terminated as a result, Contractor shall be required to take such steps as may be necessary to either self-perform the services that would have been provided under the subcontract or retain a replacement subcontractor as soon as possible so as not to delay project completion.

Contractor shall advise each subcontractor of the District's rights and the subcontractor's obligations hereunder. Any additional costs attributable directly or indirectly to remedial action under this Article shall be the responsibility of Contractor.

#### **16. Clarifications/Discussions**

Clarification means communication with Offeror for the sole purpose of eliminating minor irregularities, informalities, or apparent clerical mistakes in the Bid. It is achieved by explanation or substantiation, either in response to an inquiry from the District or as initiated by Offeror. Clarification does not give Offeror an opportunity to revise or modify its Offer, except to the extent that correction of apparent clerical mistakes results in a revision.

#### **17. Confidential Information**

Confidential information request: If Offeror believes that its Bid contains trade secrets or proprietary information that should be withheld from public inspection, a statement advising the School District of this fact shall accompany the Bid, and the information shall be so identified wherever it appears. The School District shall review the statement and shall determine in writing whether the information shall be withheld. If the School District determines to disclose the information, the School District shall inform Offeror in writing of such determination.

#### **18. Prohibition of Reprisals**

The Vail School District is committed to complying with Federal requirements related to whistleblower protections. To that end, an employee may not be discharged, demoted, or otherwise discriminated against as a reprisal for disclosing, including a disclosure made in the ordinary course of an employee's duties, to the Board, an inspector general, the Comptroller General, a member of Congress, a State or Federal regulatory or law enforcement agency, a person with supervisory authority over the employee (or such person working for the employer who has the authority to investigate, discover, or terminate misconduct), a court or grand jury, the head of a Federal agency, or their representatives, information that the employee reasonably believes is evidence of;

- A. gross mismanagement of a contract or grant;
- B. a gross waste of public funds;
- C. a substantial and specific danger to public health or safety related to the implementation or use of public funds;
- D. an abuse of authority related to the implementation or use of public funds; or a violation of law, rule, or
- E. regulation related to a school district contract (including the competition for or negotiation of a contract) or grant, awarded or issued relating to public funds.

## SPECIAL INSTRUCTIONS TO OFFERORS

### 1. Pre-Bid Conference

A Pre-Bid Conference may be held at the time and location indicated on Page 1. The contractor is responsible to visit the site to ascertain the full extent of work be required. No additional compensation will be allowed for failure to ascertain full extent of the work through visual inspection of existing conditions. All interested parties will have the opportunity for a visual inspection during the Pre-Bid Conference. Attendance to the pre-bid conference is **not mandatory**, in order to respond to this bid. Site visits shall not be scheduled separate of the pre-bid conference.

### 2. Inquiries

All questions regarding this IFB must be submitted by email no later than 3:00 p.m., Arizona Time, on April 24, 2025 to Mark Bollard at mbollard@swaimaia.com. The Offeror shall not contact any other individuals to obtain information concerning the solicitation or its contents.

### 3. Interpretations and Amendments

Should a Offeror find discrepancies in, or omissions from, the Solicitation Documents, or is in doubt as to their meaning, Offeror must at once notify the District, who will send a written instruction to each person receiving a set of documents. The Offeror submitting a request for interpretations will be responsible for its prompt delivery. All requests for interpretations shall be made in writing. The District will not be responsible for any explanations or interpretations except those duly issued in the form of written Amendment. Receipt of any Amendment so issued during the time of bidding shall be included in the bid and shall be acknowledged in the Bid and be made a part of the Contract Documents.

### 4. Purpose of Specifications

Specifications are designed to enable Offeror to satisfy a requirement for a product, material, process, or service. A specification may be expressed as a standard, part of a standard, or independent of a standard. No specification is intended to limit competition by eliminating items capable of satisfactorily meeting the requirements of the procurement. If Offeror believes a specification is unnecessarily restrictive, Offeror must indicate such in its bid.

### 5. Use of Brand Names

Brand names, trade names, model numbers, and/or catalog numbers are used to indicate the character, quality, and/or performance characteristics of the materials desired. Use of the name of a manufacturer, brand, make or catalog number does not restrict Offeror from offering suitable alternates. However, Willcox Unified School District reserves the right to decide whether alternatives to the identified manufacturer and brand are equal to the materials, equipment described in the solicitation. Willcox Unified School District will be the sole judge on the question of equal quality, and the District's decision shall be final.

### 6. Examination of Contract Documents and Project Site

A. Before submitting a Bid, Offerors shall carefully examine all of the Contract Documents and visit the Project site and fully inform themselves as to all existing conditions and limitations. Offerors shall include in their Bid a sum to cover the cost of all items included in the Contract. The Offeror, if awarded the Contract, shall not be allowed any extra compensation by reason of any matter or thing, concerning which such Offeror might have fully informed themselves prior to the bidding.

B. All quantities for bid submittal purposes are to be field verified by Offeror prior to submitting bid submittal. The Offeror is cautioned that it is the Offerors sole responsibility to submit information related to the evaluation categories and that the Willcox Unified School District is under no obligation to solicit such information if it is not included

with the Offerors bid. Failure by the Offeror to submit such information may cause an adverse impact on the evaluation of the Offerors bid.

## 7. Request for Approved Equal

Identification of material or equipment by manufacturer's name or trade name is not meant to give preference to any manufacturer, but merely to establish a standard.

A. Offerors shall submit written requests to obtain approval to use unspecified products no later than **3:00 pm on April 24, 2025**. Requests received after this time will not be considered. Requests shall clearly describe the product for which approval is asked, including data necessary to demonstrate acceptability. The District shall consider and either approve or reject all proposals submitted and shall comply with the following requirements:

1. If the District has approved an alternative product offering, the Offeror will be contacted with the approval and the Offeror's Bidding Documents shall be modified to include the alternative products.
2. If the District rejects an alternative product proposal, notice of the rejection shall be given to the Offeror prior to the deadline for receiving bids. Notice shall include an explanation for rejection of the product.

B. The Offeror's request for approval of any substitution shall include all of the following:

1. Complete data substantiating compliance of the proposed substitution with the Contract Documents.
2. Product identification, including manufacturer's name, address and phone number.
3. Manufacturer's literature showing complete product description, performance and test data and all reference standards.
4. Samples and colors in the case of articles or products.
5. Name and address of similar projects on which the product was used and date of installation.
6. For construction methods, include a detailed description for proposed methods.
7. Itemized comparison of proposed substitutions with product or method specified.
8. An "Intent to Warranty" on letterhead from the manufacturer or reputable distributor listing Vail Unified District as the District with the School Site as the address.

C. Substitution requests shall be made on the "Substitution Request Form" included in this bid package.

D. The decision of the District regarding the approval of items for which substitution is requested will be final. In the event of an approved substitution, if such substitution is later determined by the District to be unacceptable for any reason, including the necessity to perform extended redesign or rework of the project in order to accommodate the substitution, or if it becomes apparent to the District that the substituted item will not perform or function as well as the specified item, the Offeror will be required to furnish the original specified item or request approval to use another substitution. The Offeror will pay all costs, expenses or damages associated with or related to the unacceptability of a substitution and the resultant utilization of any item. The Offeror further understands and agrees that a time extension will not be granted due to delays associated with or related to the unacceptability of a substitution.

E. If a substitution is approved; no subsequent change in brand or make will be permitted unless satisfactory written evidence is presented to the District that the manufacturer cannot make scheduled delivery of the approved substitute item.

F. Substitutions will not be considered for approval by the District prior to or after the award of the Contract if:

1. The proposed substitution is indicated or implied on shop drawings or product data submittals and has not been formally submitted for approval by the Offeror in accordance with the above stated requirements.
2. Acceptance of the proposed substitution will require substantial design revisions to the Contract Documents or is otherwise not acceptable to the District.

## 8. Approval of Equal Items of Equipment and/or Materials Before Submission of Bids

Time is of the essence for this project. If an Offeror wishes to use items of equipment and/or materials other than those identified by trade or manufacturer's name, model or catalog number in the Specifications, Offeror shall submit the request for approval to the District no later than 3:00 pm on **April 24, 2025**. Approvals will be granted only upon individual requests of prime bidding contractors. No approvals for substitutions will be granted directly to suppliers, distributors or subcontractors. Each request shall include all basic data and characteristics of the proposed item, so that a direct comparison can be readily made. It is the sole responsibility of the Offeror to submit complete descriptive and technical information so that the District can make a proper appraisal. All requests shall be in writing, addressed to Mark Bollard from Swaim Associates at mbollard@swaimaia.com. If the District has approved an alternative product offering, the Offeror will be contacted with the approval and the Offeror's Bidding Documents shall be modified to include the alternative products.

## 9. Submission of Bid Package

The bid package, also known as the Offer, should be prepared simply and economically, providing a straightforward, concise description of the capabilities to satisfy the requirements of the IFB. Emphasis should be on the completeness and clarity of content and should include the forms and information listed within this Section. Using the Bid Cover Sheet (Checklist) provided within the IFB is strongly recommended to ensure all necessary information is included for the submission of a bid package.

- A. Questionnaire:** A completed Questionnaire is required and provides pertinent details about the Offeror. Details sought in the Questionnaire include:

### 1. Company Profile

- A. Primary Office location and Contact details (address, phone numbers, email address, etc.)
- B. AZ ROC license(s)
- C. Litigation and Complaints
- D. Fingerprinting and Background Clearances

**2. References:** A minimum of three (3) references should be included for projects of similar scope in Arizona including the following details: District, Contact Person, Cell Phone Number, Email Address and Date of Project.

- B. Amendment Acknowledgement:** The form shall be used to acknowledge any/all Amendments that may be issued. The form does not have to be submitted within the bid package if no Amendment(s) is issued. Signatures provided on this document serve as confirmation that the Offeror has reviewed and acknowledges any change, clarification or modification made to the original bid and/or related documents.

- C. Bonding:** All bonds shall be provided to Willcox Unified School District and must be from Surety Companies licensed in the State of Arizona, with a General Power of Attorney and rated "A+" in Best's Guide.

**1. Bid Bond:** An irrevocable bid security payable to the Willcox Unified School District in the amount of 10.00% of the total bid project cost is required. This security should be in the form of a bid bond, certified check, cashier's check, or cash and must be in the possession of the District by the due time and date cited for this solicitation.

**2. Performance Bond:** The contractor shall be required to furnish an irrevocable security in the amount of 100.00% of the total contract price payable to the Willcox Unified School District , binding the contractor to provide faithful performance of the contract. This security must be in the possession of the District within 48 hours after receipt of purchase order or other notice of award. The cost of this bond is itemized on the bid submittal form.

Performance security shall be in the form of a performance bond, certified check or cashier's check. This security must be in the possession of the District within 48 hours after receipt of purchase order or other notice of award. If the contractor fails to execute the security document, as required, the contractor may be found in default and the contract terminated by the District. In case of default, the District reserves all rights to recover as provided by law. All performance bonds must be executed on forms substantially equivalent to the form included with this solicitation. Tills security must be in the possession of the District within 48 hours after receipt of purchase order or other notice of award.

**3. Payment Bond:** The Contractor shall be required to furnish non-revocable security for the protection of all persons supplying labor and material to the contractor or any subcontractor for the performance of any work related to the contract. Payment security shall be in the amount of 100% of the total contract price and be payable to the Willcox Unified School District . The cost of this bond is included in your base bid.

Payment security shall be in the form of a payment bond, certified check or cashier's check. All payment bonds must be executed on forms substantially equivalent to the payment bond forms on file at the District and incorporated by this reference. This security must be in the possession of the District within 48 hours after receipt of purchase order or other notice of award.

- D. Subcontractors:** A completed Subcontractor form shall be included listing only one name for each branch of the work. This form should be included even if your firm is self-performing 100% of the work and not utilizing any Subcontractor(s). The Subcontractor list should be submitted in separate envelope in the bid package. It is the contractor's responsibility to know if their license classification is valid to perform the Scope of Work, as presented. Contractors listed on the Subcontractor form are only valid if the firm possesses a license for the specified type of work. The Subcontractor list may not be changed from as submitted without the District's written approval.
- E. Confidential Information:** If a person believes that any portion of a proposal, bid, offer, specification, protest or correspondence contains information that should be withheld, then the Procurement Officer shall be so advised in writing (price is not confidential and will not be withheld). Such material shall be identified as confidential wherever it appears. The District, pursuant to R7-2-1016, shall review all requests for confidentiality and provide a written determination. If the confidential request is denied, such information shall be disclosed as public information, unless the person utilizes the 'Protest' provision as noted in R7-2-1142.
- F. Bid Pricing Submittal:** Offerors must submit their pricing as outlined on the Bid Pricing Submittal form. Additions and subtractions will be determined upon project completion. These line items are to be added to the Base Bid and other line items listed to provide the overall Total Bid Project Cost. Other items listed on the Bid Pricing Submittal include:
- 1. Restatement of Work:** The Restatement of Work should provide a few short sentences detailing the major tasks involved in the project and include the product(s) being used. A statement such as "per plans and specs" does not qualify as indication of understanding of the Scope of Work and is not acceptable. This Restatement of Work should also include the major product(s) being used for the project. Failure to provide the restatement demonstrating competence and understanding of the Scope of Work and specifications for the project could result in the bid being determined non-responsive.
  - 2. Schedule (Based on Notice to Proceed):** On your letterhead, a schedule based on Notice to Proceed through Substantial Completion should be provided and include milestones for the project.

- G. Vendor Payment Form:** A completed Vendor Payment form provides necessary information for the District to create a purchase order and subsequent payments and should be included in the bid package.
- H. Asbestos Certification - Notarized:** The completed form should be notarized and included in the bid package to attest that all materials to be used in the project are and shall be free of asbestos.
- I. Offer and Acceptance:** Offeror shall include a signed Offer and Acceptance Form. The Offer and Acceptance Form shall be signed with an original signature by an Authorized Representative of the Offeror, and shall be submitted with the submitted bid no later than the Offer due date and time. Failure to return a signed Offer and Acceptance Form may result in rejection of the Offer.
- J. Deviations and Exceptions:** The form shall be completed if there are any deviations/exceptions to the information found within the Invitation for Bid. Any deviation or exception not included on the form provided shall be without force and effect in any resulting Contract. Failure to show specific deviations indicates full compliance with the IFB.
- K. Conflict of Interest:** A statement disclosing any relationship with a District Employee or Governing Board member must be included in the bid package.
- L. Drug-Free Workplace:** The form indicates if your firm has a policy in place or not and should be included in the bid package.
- M. Non-Collusion – Notarized:** Offeror attests that the bid is genuine, is neither a sham nor collusive, nor is made in the interest for or on behalf of any person or corporation not named within the bid. The Offeror has not in any manner sought by collusion or anti-competitive means or practices to secure for itself an advantage over any other Offeror. It also certifies that the Offeror has not directly or indirectly induced or solicited any other Offeror to put in a sham or collusive bid, or induced or solicited any other Offeror to refrain from submitting an offer. This form shall be notarized.
- N. I.R.S. W-9 Form, Request for Taxpayer Information:** Offeror should submit a current I.R.S. W-9 Form with the bid package. The W-9 form is required in order to receive payment under the Contract.

## 10. Offer Submission, Due Date and Time

It is the Offeror's responsibility to ensure that the bid package is delivered on the due date by the time required. Delivery times vary for all packages delivered to the Willcox Unified School District . If packages are received after the due date and time specified in the solicitation due to carriers like UPS or Fed Ex delivering late, Willcox Unified School District will not be held responsible and the late bid package will not be considered.

## 11. Evaluation

- A. Opening:** Sealed bids received by the correct time and date shall be opened and each Offeror's pricing shall be publicly read. All other information contained in the Offer shall remain confidential until award is made.
- B. Evaluation Criteria:** Bids may not be considered responsive and/or acceptable if they do not contain information sufficient to perform the necessary vetting of information requested in the IFB. Necessary components include an indication of the Offeror's intent to be bound, bid pricing submittal, acknowledgement of amendment(s), appropriate bonds, warranty information, company profile and any pertinent reference data as required. As stated in the Uniform Instructions, Exceptions to the Terms and Conditions may impact a Offeror's susceptibility for award. Once the bid package is determined responsive and the Offeror is determined to be responsible, price is the most important factor. A tally sheet will be developed with the pricing and costs requested in the IFB.

- C. Clarification of Bid Submittals:** Clarification means communication with Offeror for the sole purpose of eliminating minor irregularities, informalities, or apparent clerical mistakes in the Bid. It is achieved by explanation or substantiation, either in response to an inquiry from the District or as initiated by Offeror. Clarification does not give Offeror an opportunity to revise or modify its Offer.
- D. Responsibility, Responsiveness and Acceptability:** In accordance with R7-2-1076, R7-2-1161, R7-2-1168, R7-2-1171, and R7-2-1003 (B), R7-2-1031 or R7-2-1046, the District shall consider the following in determining Offeror's responsibility as the responsiveness of bids submitted in response to the solicitation. Determinations of non-responsibility and/or non-responsiveness shall be made in writing and shall set forth the bases for the determination. Bids determined to be non-responsive and/or non-responsible shall prevent the bid from evaluation and the Offeror shall be notified accordingly.

### **1. Mandatory Responsiveness Requirements:**

- a. A Signed Offer Form is included;
- b. A Bid Bond is included;
- c. Offeror possesses a valid license to perform the Scope of Work identified;
- d. Offeror does not have any unresolved issues at the Arizona Registrar of Contractors;
- e. Offeror does not have any unresolved issues with previous District; and
- f. References demonstrating experience with similar projects of size and scope in Arizona.

### **2. Debarment, Suspension or Contract Termination**

Offerors may not be considered responsible if they have been debarred from the practice of their profession that would otherwise be necessary in the provision of goods and services under any resulting contract. Offerors may not be considered responsible if they have had a contract with the District, within the last three-years, that was terminated for cause, due to breach or similar failure to comply with the terms of any such contract. Offerors may also not be considered responsible if there is factual evidence of their frequent and reoccurring failure to satisfy the terms of their agreements and contractual relationships, both with the District or other government entities. Factual evidence shall consist of any documented vendor performance reports, customer complaints and/or negative references.

### **3. Bid Submittal Package**

Bids may not be considered responsive if they are not submitted in the requested format; if they include significant exceptions to any requirements, terms or conditions that render the bid unacceptable; or do not contain sufficient contents with which to evaluate the bid, e.g., bonds, product information, key personnel, references, pricing and/or other requested information. Failure to submit all requested information may result in rejection of the bid.

### **4. Additional Responsibility Factors**

- a. The proposed contractor's stability, material, personnel and other resources, including subcontractors;
- b. The proposed contractor's record of performance and integrity;
- c. Whether the proposed contractor is qualified legally to contract with the public entity;
- d. Whether the proposed contractor supplied all necessary information concerning its responsibility;
- e. Complaints on file with the Registrar of Contractors;

f. Prior litigation history; and References.

## 12. Award

**A. Contract Award:** An award will be made to the lowest responsive and responsible Offeror that conforms in all material respects to the requirements outlined in the Invitation for Bid. The District reserves the right to award the base bid and any combination of alternates, if any, that is deemed most advantageous to the District in determining the lowest responsive and responsible Offeror. If a Offeror is awarded a contract and is unable to meet its contractual obligations, Willcox Unified School District may cancel the Contract and award to the next lowest ranked Offeror if the determination occurs within a reasonable time period after original Contract Award.

**B. Contract Implementation Meetings:** The Contractor may be required to participate in meetings for the successful implementation of the contract. Meetings, if any, will be at the discretion of the District. The Contractor will be notified in advance of any meeting times, frequency for future meetings, if any, and locations to ensure all appropriate district and contractor staff/representatives attend. The District reserves the right to decline conference call attendance or participation.

## **SPECIAL TERMS AND CONDITIONS**

### **1. Purpose**

### **2. Site Visit**

The contractor is responsible to visit the site to ascertain the full extent of work be required. No additional compensation will be allowed for failure to ascertain full extent of the work through visual inspection of existing conditions. All interested parties will have the opportunity for a visual inspection during the Pre-Bid Conference. Attendance to the pre-bid conference is **not mandatory**, in order to respond to this bid. Site visits shall not be scheduled separate of the pre-bid conference.

### **3. Contract**

This contract between the District and the Contractor shall consist of the solicitation as amended, any requests for clarifications, and the bid submitted by the Contractor. In the event of a conflict in language between the documents referenced above, the provisions and requirements set forth and/or referenced in the solicitation as amended shall govern. However, the District reserves the right to clarify any contractual requirement in writing and such written clarification shall govern in case of conflict with the applicable requirements stated in the solicitation as amended or the Contractor's bid. In all other matters not affected by the written clarification, if any, the solicitation shall govern.

### **4. Contract Type**

This contract is a Fixed Firm Price.

### **5. Price Clause**

Prices shall be firm for the term of the contract. Prices as stated must be complete for the services offered and shall include all associated costs.

### **6. Substitute Securities**

The District will accept substitute securities in lieu of retention only in strict compliance with R7-2-11 14. If satisfactory progress is made on the Project, one-half of the funds held as substitute security will be returned upon fifty percent (50%) completion of the Project. Interest on all substitute securities will be held until final payment. All requests for substitute securities must be made on District approved forms, copies of which may be obtained from the District upon request.

### **7. Investigation by Offeror**

By submitting a bid, the Offeror certifies the Offeror has investigated all required fees, permits and regulatory requirements of authorities having jurisdiction and has properly included in the submitted bid the costs of such fees, permits and requirements not otherwise indicated as provided by the District.

### **8. Contract Award**

The District intends to award a fixed firm price contract to a single Offeror, unless otherwise indicated, resulting from this solicitation to the responsible Offeror whose bid represents the best value after evaluation in accordance with the criteria identified in the solicitation. The District may waive informalities and minor irregularities on bids received. The Offeror's initial bid should contain the Offeror's best terms from a price or cost and technical standpoint. The District reserves the right to make an award on any item for any quantity less than the quantity offered, at unit costs or prices offered, unless the Offeror specifies otherwise in the bid. The District may reject any or all bids if such action is in the District's best interest.

## **9. Terms of Award**

It is the intent of the District to recommend a single award of this contract to the Willcox Unified School District Governing Board.

## **10. Award Basis**

The successful Offeror(s) will be determined by the Evaluation Criteria, as presented. Awards will not be made based on price alone, as the Offeror must be responsive and responsible. The District reserves the right to award as many contracts for the services as may be in the best interest of the District. If a contractor receives a bid award, an order is placed and contractor is unable to meet the delivery requirements, meet service requirements, or material that meets the District's needs as outlined in this Invitation for Bid, or is unable to hold bid price, or fails to provide product or service within a reasonable period of time, AND/OR fails to provide product complying with bid specifications, as determined by the District, the District reserves the right to go to the next lowest bid price of equal quality which meets bid specifications. If the bid item delivered does not meet specifications or is received in an unsatisfactory condition and is in a damaged or unusable condition, or if service is unsatisfactory, contractor must pick up item immediately and replace to the District's satisfaction at no additional charge, or issue full credit, for service a return visit must be re-scheduled within 24 hours. Rejected items must be removed from the District's premises by the Offeror upon verbal notification.

However, if a Offeror receives a contract award and is unable to meet the service requirements as outlined in this Solicitation (and subsequent contract), or is unable to hold the contract price, or fails to provide acceptable service as determined by the District, the District reserves the right to go to the next highest ranked Offeror if this determination occurs within a reasonable time period after contract award.

## **11. Retention**

Mark Bollard, the Project Representative from Swaim Associates, and the Willcox Unified School District Superintendent, Kevin Davis shall perform the final inspection. R7-2-1104 requires 10% retention of the total cost of the job will be held until the final inspection is accepted by the District. The Contractor shall seek written approval from an appropriate District Representative for any changes or deviations from specifications or instructions.

## **12. Progress Payments**

Progress payments may be allowed. Requests for payment must be submitted through Mark Bollard for approval and sign-off. Retention, often percent (10%) of the requested payment, will be withheld until the final punch list is completed.

On or about the first day of each calendar month during the course of construction, the Contractor shall submit an itemized Application to Mark Bollard supported by such data substantiating the Contractor's right to payment as the District or Swaim Associates may require.

Payment shall be based on the work actually performed during the preceding calendar month. Payment may be made for equipment not yet installed but delivered and suitably stored at the project site, or at some other location agreed upon in writing by Swaim Associates and the District to be transported to the site and installed at a later date, under such conditions agreed upon in writing by the District.

Material delivered and suitably stored at the project site, or at some other agreed upon location by the Contractor, subcontractors, sub-subcontractors or material suppliers shall be insured to the full value of the material and shall be suitably stored and protected. Any material that is in accordance with the Contract Documents shall be installed into the Work. Until the final acceptance of the building by the District, it shall be the Contractor's responsibility to protect all materials and equipment installed or delivered to the Project.

The Contractor warrants and guarantees that title for all Work, materials and equipment covered by the Contract Documents shall be passed to the District upon final acceptance and that such Work, materials and equipment shall be free and clear of all liens, claims, security interests or encumbrances.

### **13. Approvals for Payment**

If the Contractor has submitted an Application as above (Progress Payments), then not later than the fifth day of the month, Swaim Associates shall approve or otherwise act on the Application and forward the Application to the District immediately for such amount as determined to be properly due, or state in writing the reasons for withholding a part of or the entire amount of the amount applied for as provided in the Subsection, Payments Withheld.

Approval of the Application will constitute a representation by Swaim Associates to the District, based on observations at the site, As-Built drawings reflect current information and the data comprising the Application, that the Work has progressed to the point indicated; that, to the best of Swaim Associates's knowledge, information and belief, the equality of the Work is in accordance with the Contract Documents (subject to (1) an evaluation of the Work as a functioning whole upon Substantial Completion, (2) to the results of any subsequent test required by the Contract Documents, (3) to minor deviations from the Contract Documents correctable prior to final completion, and (4) to any specific qualifications stated in his approval of the Application); and that the Contractor is entitled to payment in the amount approved. In addition, Swaim Associates's final approval for payment will constitute a further representation that all the conditions precedent to the Contractor's being entitled to final payment has been fulfilled.

### **14. Payments Withheld**

Swaim Associates may decline to approve an Application and may withhold a Certificate in whole or in part if unable to make representations to the District as provided in Approvals for Payment. Swaim Associates may also decline to approve any Application or, because of subsequently discovered evidence or subsequent inspections, may nullify the whole or any part of any Certificate for Payment previously issued to such extent as may be necessary if within a professional opinion to protect the District from loss because of:

- A. Defective work not remedied;
- B. Claims filed or reasonable evidence indicating probable filing of claim;
- C. Failure of the Contractor to make payments to Subcontractors or for labor, materials or equipment;
- D. Reasonable doubt that the Work can be completed for the unpaid balance of the Contract Sum;
- E. Damage to another contractor;
- F. Reasonable indication that the Work will not be completed within the Contract Time; or
- G. Unsatisfactory prosecution of the Work by the Contractor.

### **15. District's Right to Request Completion of Work**

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, or fails to perform any provision of the Contract, the District shall after seven days' written notice to the Contractor, and without prejudice to any other remedy he may have, notify the bonding company of such default or lack of performance, and proceed to make such other necessary and reasonable arrangements to carry out the work in accordance with the Contract Documents, all at the expense of the Contractor, including the District's costs and attorneys' fees.

### **16. Key Personnel**

It is essential that the contractor provide adequate experienced personnel, capable of and devoted to the successful accomplishment of work to be performed under this contract. The contractor must agree to assign specific individuals to the key positions.

A. The contractor agrees that, once assigned to work under this contract, key personnel shall not be removed or replaced without written notice to the District.

B. If key personnel are not available for work under this contract, for a continuous period exceeding 3 calendar days, or are expected to devote substantially less effort to the work than initially anticipated, the contractor shall immediately notify the District, and shall, subject to the concurrence of the District, replace such personnel with personnel with personnel of substantially equal ability and qualifications.

## **17. Insurance**

Offeror agrees to maintain such insurance as will fully protect Offeror and the District from any and all claims under any workers' compensation statute or unemployment compensation laws, and from any and all other claims of any kind or nature for damage to property or personal injury, including death, made by anyone, that may arise from work or other activities carried on, under, or facilitated by this Agreement, either by Offeror, its employees, or by anyone directly or indirectly engaged or employed by Offeror. Offeror agrees to maintain such automobile liability insurance as will fully protect Offeror and the District for bodily injury and property damage claims arising out of the ownership, maintenance or use of owned, hired or non-owned vehicles used by Offeror or its employees, while providing services to the District.

Successful Offeror will be required to provide proof of and maintain comprehensive general liability insurance with a limit of not less than \$ 1,000,000 per occurrence and \$2,000,000 aggregate coverage with a deductible of not more than \$5,000 and naming Willcox Unified School District as an additional insured party. Successful Offeror will be required to submit proof of and maintain Worker's Compensation and Employer's Liability Insurance as required by law.

## **18. Acceptance Period**

In order to allow for an adequate evaluation, the District requires an offer in response to the solicitation to be valid and irrevocable for 60 days after the opening time and date.

## **19. Timeframe For Completion**

Work shall commence on upon award, and the notice to proceed. The substantial completion date for all work is 180 days after the notice to proceed. Work shall be continuous and final completion review will take place 210 days after the notice to proceed.

## **20. District's Contingency Allowance**

The District is not providing any contingency allowance for this solicitation.

## **21. Liquidated Damages**

If the selected Offeror fails to meet the substantial time requirements for the delivery and/or installed acceptable implementation of the project, liquidated damages of \$100 per day may be assessed for each day beyond Substantial Completion after notice to proceed. However, should an unforeseen problem arise, an extension may be granted in writing at the discretion of the District.

If the selected Offeror shall fail or refuse to complete the work within the time specified, then the selected Offeror shall agree as a partial consideration for the awarding of the contract, that the Willcox Unified School District may retain from compensation otherwise to be paid to the selected Offeror, or may recover by all remedies at law, the amount specified, not as penalty but as liquidated damages, for each and every calendar day that the selected Offeror shall be default after the time stipulated in the bid for completion of substantial work status and final completion.

## **22. Inspection**

The job will have a final inspection and acceptance by the Willcox Unified School District Director of Facilities, Jerry Wood. Any discrepancies noted during the inspection will be corrected prior to final payment. Field inspections will be performed by Mark Bollard of Swaim Associates and a representative of the Willcox Unified School District upon completion of the Project.

### **23. Damages**

The successful contractor shall be liable for any and all damage caused by the firm and or its employees to the Willcox Unified School District premises. The Offeror shall hold and save the Willcox Unified School District free and harmless from liability of any nature or kind arising from any use, trespass, or damage occasioned by Offeror's operations on premises or third persons.

### **24. Source Limitations**

Obtain materials from the source or producer that will provide the required warranty.

### **25. Licenses**

Contractor shall maintain in current status all federal, state and local licenses, bonds and permits required for the operation of the business conducted by Contractor. Contractor shall remain fully informed of and in compliance with all ordinances and regulations pertaining to the lawful provision of services under the Contract. The District reserves the right to stop work and/or cancel the contract of any Contractor whose license(s) expire, lapse, are suspended or terminated.

### **26. Compliance with Specifications**

The fact that a manufacturer, supplier or Offeror chooses not to produce or supply equipment, supplies or services to meet the specifications will not be considered sufficient cause to adjudge the specifications as restrictive. Offerors shall offer equipment, supplies, and/or services that meet the specifications as presented. The work shall meet the minimum industry standards, as applicable:

- A. American Coating Association (ACA)
- B. American Concrete Institute (ACI)
- C. American Institute of Architects (AIA)
- D. American National Standards Institute (ANSI)
- E. American Standards Association (ASA)
- F. American Society of Safety Engineers (ASSE)
- G. American Society for Testing and Materials (ASTM)
- H. Asphalt Roofing Manufacturers Association (ARMA)
- I. Construction Specifications Institute (CST)
- J. Factory Mutual (FM)
- K. International Energy Conservation Code (IECC)
- L. International Fire Code (IFC)
- M. International Mechanical Code (IMC)
- N. International Plumbing Code (IPC)
- O. National Electrical Code (NEC)
- P. National Demolition Association (NDA)
- Q. National Electrical Code (NEC)

- R. National Emission Standards for Hazardous Air Pollutants (NESHAP)
- S. National Roofing Contractors Association (NRCA)
- T. Sheet Metal Air Conditioning National Association (SMACNA)
- U. Spray Polyurethane Foam Alliance (SPF A)
- V. Tile Council of North America (TCNA)
- W. The Society for Protective Coatings (SSPC)
- X. Underwriter's Laboratories, Inc. (UL)
- Y. Western States Roofing Contractors Association (WSRCA)

## **27. Warranty and Quality Guarantee**

Contractor warrants that any equipment or material supplied to the District shall fully conform to all requirements of the contract and all representations of contractor, and shall be fit for all purposes and uses required by the contract.

**28. A. Contractor's Warranty:** Provide 2 year warranty for all content, as required by the Arizona Registrar of Contractors.

## **29. Americans with Disabilities Act of 1990**

The Contractor shall comply with the Americans with Disabilities Act of 1990 (Public Law I 0 1-336) and the Arizona Disability Act of 1992 (A.R.S § 41-1492 et. seq.), which prohibits discrimination of the basis of physical or mental disabilities in delivering contract services or in the employment, or advancement in employment of qualified individuals.

Persons with a disability may request a reasonable accommodation, such as a sign language interpreter, by contracting the procurement officer for the solicitation. Request should be made as early as possible to allow time to arrange the accommodation

## **30. Fingerprinting Requirements**

The District anticipates that services under this contract may cause the contractor and proposed subcontractors to have direct, unsupervised contact with pupils. In accordance with A.R.S. 15-512(H), a contractor, subcontractor or vendor or any employee of a contractor, subcontractor or vendor who is contracted to provide services on a regular basis at an individual school shall be required to obtain a valid fingerprint clearance card pursuant to title 41, chapter 12, Article 3.1. Therefore, the Contractor and any proposed subcontractors warrant compliance with A.R.S. subsection 41-4401, A.R.S. subsection 23-214, the Federal Immigration and Nationality ACT (FINA) and all other federal, state and local immigration laws and regulations related to the immigration status of its employees. The contractor must have all employees on-site submit to a fingerprint clearance conducted by Department of Public Safety and all employees must carry fingerprint card at all times. These warranties shall remain in effect through the term of the contract.

The District may, at its sole discretion, require evidence of compliance during the evaluation process or contract term. Should the District request evidence of compliance, the Contractor and any proposed subcontractors shall have 5 working days from receipt of the request to supply adequate information. Failure to supply the requested information or if the District suspects or finds the Contractor or any of its subcontractors are not in compliance, the District may pursue any and all remedies allowed by law, including, but not limited to: non consideration of contract award, suspension of work, termination of the contract for default, and suspension and/or debarment of the Contractor. All costs associated with verification and any remedies are the sole responsibility of the Contractor and any proposed subcontractor.

## **31. Hazard Notification**

Contractor must advise Superintendent, Kavin Davis, whenever work is expected to be hazardous to school children, District employees and/or operators. In the event that these or other hazardous materials are identified, it must be brought to the attention of Mark Bollard at Swaim Associates immediately to determine remediation efforts.

### **32. Regulatory Agencies**

It will be necessary that all work meet the requirements of all Federal, State and local regulatory agencies.

### **33. Buy American Provision**

Contractor will purchase, to the maximum extent practicable, domestic commodities or products in accordance with 7CFR§210.21(d) and 7CFR§220.16(d). Contractor shall purchase, to the maximum extent practicable, domestic agricultural commodities or products substantially processed in the United States. "Substantially" means the final processed product contains over 51% domestically grown agricultural commodities. This provision applies to all food purchases paid from the nonprofit school food services account. There are limited exceptions to this provision which allow for the purchase of products not meeting the "domestic" standard as described above ("non-domestic") in circumstances when use of domestic products is truly not practicable. However, before utilizing an exception, alternatives to purchasing non-domestic food products should be considered.

### **34. Small Businesses, Minority-Owned Firms, and Women's Business Enterprises**

In accordance with OMB Circular A-110, the District shall make a positive effort to utilize small businesses, minority-owned firms, and women's business enterprises (SMWBE), whenever possible by 1) ensuring that SMWBE are used to the fullest extent practicable; 2) making information on forthcoming opportunities available and arranging time frames for purchases and contracts to encourage and facilitate participation by SMWBE; 3) considering in the contract process whether firms competing for larger contracts intend to subcontract with SMWBE; 4) encouraging contracting with consortiums of SMWBE when a contract is too large for one of these firms to handle individually; and 5) using the services and assistance, as appropriate, of such organizations as the Small Business Administration and the Department of Commerce's Minority Business Development Agency in the solicitation and utilization of SMWBE.

### **35. Disclosure of Lobbying Activities**

Pursuant to Byrd Anti-Lobbying Amendment 31 USC 1352, Contractor must disclose lobbying activities in connection with school nutrition programs. If there are material changes after the initial filing, updated reports must be submitted on a quarterly basis. 7CFR§3018.100 (Only applies to contracts over \$100,000)

### **36. Certification Regarding Lobbying**

Pursuant to 31 USC 1352, Contractor must submit a certification regarding lobbying which conforms in substance with the language provided in C.F.R. Part 200.450. By signing the Offer & Acceptance form, Contractor shall certify that no appropriated funds may be expended by the recipient of a Federal contract, grant, loan, or cooperative Agreement to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions. (Only applies to contracts over \$100,000)

### **37. Certificate of Independent Price Determination**

Offeror agrees that all prices in this Offer have been arrived at independently, without consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Offeror or with any competitor certification regarding non-collusion.

### **38. Civil Rights Compliance**

In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, sex, disability, age, or reprisal or retaliation for prior civil rights activity in any program or activity conducted or funded by USDA.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the Agency (State or local) where they applied for benefits. Individuals who are deaf, hard of hearing or have speech disabilities may contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program complaint of discrimination, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at [http://www.ascr.usda.gov/complaint\\_filing\\_cust.html](http://www.ascr.usda.gov/complaint_filing_cust.html), and at any USDA office, or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: [program.intake@usda.gov](mailto:program.intake@usda.gov).

### **39. Clean Air Act, Clean Water Act, and Environmental Protection Agency Regulation**

Contractor shall comply with all applicable standards, orders or requirements issued under Section 306 of the Clean Air Act, Section 508 of the Clean Water Act, Executive Order 11738 and Environmental Protection Agency regulations which prohibit the use, under nonexempt federal contracts, grants or loans to facilities included on the EPA List of Violating Facilities. The District will report all violations to ADE and to the USEPA Assistant Administrator for Enforcement. (Only applies to contracts over \$100,000)

### **40. Contract Work Hours and Safety Standard Act**

Contractor shall comply with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327–330) as supplemented by Department of Labor regulations (29 C.F.R. Part 5). (Only applies to contracts over \$2,500)

### **41. Debarment, Suspension, Ineligibility and Voluntary Exclusion**

By signing the Offer & Acceptance form, Contractor shall certify that they have not been debarred, suspended, or otherwise excluded from or ineligible for participation in federal assistance programs under executive order 12549 and 12689. Contractor shall comply with regulations implementing Office of Management and Budget Guidance in Non-procurement Debarment and Suspension codified at 2 C.F.R. Part 180 and 2 C.F.R. Part 417. These regulations restrict transactions with certain parties that are debarred, suspended or otherwise excluded from, or ineligible for, participation in Federal assistance programs or activities. (Only applies to contracts over \$25,000)

### **42. Energy Policy and Conservation Act**

Contractor shall meet the mandatory standards and policies relating to energy efficiency which are contained in the State Energy Conservation Plan issued in compliance with the Energy Policy and Conservation Act. (Pub. L. 94–163, 89 Stat. 871.)

### **43. Equal Employment Opportunity**

Contractor shall comply with Executive Order 11246 of September 24, 1965, entitled “Equal Employment Opportunity,” as amended by Executive Order 11375 of October 13, 1967, and as supplemented in Department of Labor regulations (41 C.F.R. chapters 60).

### **44. Record Keeping**

The books, documents, papers and records of Contractor pertaining to operations under this Agreement shall be available to the District at any reasonable time. These records are subject to inspection or audit by duly authorized representatives of the District, State Agency, the US Department of Agriculture, and the US General Accounting Office at any reasonable time and place.

The District shall maintain such records, for a period of not less than five (5) years after the final day of the contract, or longer if required for audit resolution (A.R.S §35-214). 7CFR§210.23 and 2 C.F.R. Part 200.318(i).

#### **45. Invoicing**

Contractor fully discloses all discounts, rebates, allowances and incentives received by Contractor from its suppliers. If Contractor receives a discount, rebate, allowance, or incentive from any supplier, Contractor must disclose and return to the District the full amount of the discount, rebate, or applicable credit that is received based on the purchases made on behalf of the District. Contractor must identify the amount of each discount, rebate and other applicable credit on bills and invoices presented to the school food authority for payment and individually identify the amount as a discount, rebate, or in the case of other applicable credits, the nature of the credit. 7CFR§210.21(f)(1)(iv).

No expenditure may be made from the nonprofit school food service account for any cost resulting from a cost-reimbursable contract that fails to include the requirements of 7CFR§210.21, nor may any expenditure be made from the nonprofit school food service account that permits or results in Contractor receiving payments in excess of the Contractor's actual, net allowable costs. 7CFR§210.21 (f)(2)

#### **46. Termination Clause**

The contract may be terminated for cause and for convenience by the District. Appendix II to 2 C.F.R. Part 200. (Only applies to contracts over \$10,000).

#### **47. Other Requirements**

This is an occupied school campus where the educational process comes first. Therefore, scheduling is essential to completing the project successfully. Significant coordination is required in terms of work processes to avoid disruption of the educational environment. Thus, the ultimate standards must be in place:

- A. Sign-in and present positive identification;
- B. Park in assigned locations;
- C. No weapons in vehicles or on campus;
- D. No smoking on campus;
- E. No foul or offensive language;
- F. No alcohol or tobacco use of any kind on campus to include on person, in vehicles or equipment;
- G. No clothing referencing any of the above;
- H. No speaking to students;
- I. No leering or whistling;
- J. Site must be safe at the end of each day;
- K. These are no tolerance terms.

## SCOPE OF WORK

### Project

This project includes several areas and components:

- A. Weight Room and Locker Room remodel in the old Gym.

### Drawings, Detailed Scope of Work and Specifications

Refer to Drawings and Specifications dated 11/20/2025 issued for this project.

### School Information

Willcox High School  
240 N. Bisbee Ave  
Willcox, AZ 85643

### School Calendar

Refer to District Website for yearly school calendar.

### Work Hours

Work hours for this project are to be worked out between the Superintendent, Kevin Davis, and the awarded Offeror.

### Utilities

Contractor shall provide, and maintain in clean order, temporary toilet facilities for use throughout the project duration. Locations shall be approved by the District.

### Cleanup

The Contractor, at all times, shall keep the premises free from accumulation of waste materials or rubbish caused by construction operations. Upon completion of the work, remove all waste materials and rubbish from and about the Project, as tools, construction equipment, machinery and surplus materials. If the Contractor fails to clean up the work, the District may do so and the cost thereof shall be charged back to the Contractor. Remove all surplus materials and debris of every nature resulting from operations, and put the site in a neat, orderly condition. District trash receptacles shall not be utilized without specific written approval.

### Worksite Safety Restoration

The contractor shall repair, rebuild or otherwise acceptably restore any property on or adjacent to the worksite that was damaged during the course of work on the project. Such restoration shall be at the contractor's expense, and is not subject to reimbursement by the District. Awarded firm shall remove all old equipment, trash/waste from the worksite as a result of their efforts.

### Questions

Offerors who have questions about this IFB are required to submit their questions, by email, to Mark Bollard at [mbollard@swaimaia.com](mailto:mbollard@swaimaia.com). **All questions must be submitted by December 9, 2025, at 3:00 p.m., Arizona Time.** Responses will be addressed in an Addendum to the IFB if necessary. Addendums must be acknowledged where designated in the solicitation. The purpose of the Addendum is to clarify, if necessary, the terms of this Invitation for Bid, and to prevent any misunderstanding of the District's intention in this matter. If anyone should have a discrepancy in, or omission from, the general terms and conditions of this Invitation for Bid, or if in doubt as to their meaning, such matters should be presented in writing.

Phone calls with questions or requests for information regarding the Invitation for Bid will not be accepted. Oral statements or instructions will not constitute an amendment to this Invitation for Bid. Please submit any questions or discrepancies to Mark Bollard at [mbollard@swaimaia.com](mailto:mbollard@swaimaia.com). We recommend you request a delivery and read receipt of all e-mails sent to the District regarding this solicitation.

**SUBSTITUTION REQUEST FORM**

**Delete if not applicable**

**If your organization is offering substitution equipment for consideration submit this completed form via email to:**

Architect, Mark Bollard, at mbollard@swaimaia.com no later than **3:00 p.m. Arizona Time, December 9, 2025.**

The following is hereby submitted for consideration to use the following product in place of the specified model: **XXX**.

Proposed Substitution:

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The complete product description, drawings, photographs, performance and test data and other information necessary for evaluation are found attached, including specific model numbers, finishes, options, etc.

**A.** Is the "Intent to Warranty" from the manufacturer or reputable distributor attached listing the School Site address and Willcox Unified School District as the Owner?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

**B.** Are changes required to the current project design in order to properly install proposed substitutions? Is the weight equal?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

**C.** Will the undersigned pay for changes to the project design, including engineering and drawing costs, caused by requested substitutions?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

**D.** List differences between proposed substitution(s) and specified item. (Additional sheets may be included to support your statements below).

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**E.** Does substitution affect Drawing dimensions?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

**F.** What effect does substitution have on other trades?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

**G.** Does manufacturer's warranty or proposed substitution differ from that specified?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

**H.** Will substitution affect progress schedule?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

I. Will substitution require more license fees or royalties than specified product?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

J. Will maintenance and service parts be locally available for substitutions?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

K. Does the manufacturer have an unresolved warranty issues with any previous District projects?

Yes \_\_\_ No \_\_\_ If No, explain: \_\_\_\_\_

**Submitted By:**

\_\_\_\_\_  
Signature Printed Name Date

\_\_\_\_\_  
Telephone Email Fax

**For District Use Only:**

\_\_\_\_\_  
Signature Printed Name Date

Accepted \_\_\_\_\_  
Accepted as Noted Below

Rejected \_\_\_\_\_  
Rejected as Noted Below

Remarks:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## BID COVER SHEET

Two (2) sealed copies of your bid, (1) original and (1) copy, must be submitted. The Willcox Unified School District No. 20 will not assume responsibility for any costs related to the preparation or submission of the bid.

| Checklist   | Initial each Box when completed |
|---|---------------------------------|
| <b>Bid Pricing Submittal</b> – should include   |                                 |
| <ul style="list-style-type: none"> <li>• <i>Guarantees of materials, warranty and workmanship</i></li> </ul>  |                                 |
| <ul style="list-style-type: none"> <li>• <i>Restatement of Work</i></li> </ul>  |                                 |
| <ul style="list-style-type: none"> <li>• <i>Scheduled based on Notice to Proceed through Substantial Completion on company letterhead</i></li> </ul>  |                                 |
| <ul style="list-style-type: none"> <li>• <i>Intent to Warranty – required for applied coating systems only</i></li> </ul>   |                                 |
| <b>Bid Bond</b> – 10% of the Total Bid Project Cost   |                                 |
| <b>Performance Bond</b> – <i>within 48 hours of award</i>   |                                 |
| <b>Payment Bond</b> – <i>within 48 hours of award</i>   |                                 |
| <b>Subcontractor List</b> – Should be completed and submitted in a separate envelope even if self-performing 100% of the work. Applied coating systems certification should be included, if applicable to any Subcontractors listed |                                 |
| <b>Questionnaire</b>  |                                 |
| <ul style="list-style-type: none"> <li>• <i>Company Profile Information</i></li> </ul>  |                                 |
| <ul style="list-style-type: none"> <li>• <i>References</i></li> </ul>   |                                 |
| <ul style="list-style-type: none"> <li>• <i>Copy of appropriate AZ Construction License(s)</i></li> </ul>   |                                 |
| <b>Offer and Acceptance</b>   |                                 |
| <b>Confidential / Proprietary Statement</b>   |                                 |
| <b>Conflict of Interest</b>   |                                 |
| <b>Non-Collusion Statement</b> - Notarized  |                                 |
| <b>Deviations and Exceptions</b>  |                                 |
| <b>Certification of Insurance</b>   |                                 |
| <b>Vendor Application</b>   |                                 |
| <b>I.R.S. W-9 Form</b>  |                                 |
| <b>Bid Package Label</b>  |                                 |

The form of contract for any award made as a result of this bid will be a district purchase order referencing this bid. The amount will be based upon the fees shown in the bid, and will take into consideration previous and anticipated expenses for the forthcoming year. If your firm will require the District to sign an additional or separate contract, a copy of the proposed contract must be included with the bid.

## BID SUBMITTAL

**Bid submittal of:** \_\_\_\_\_  
 (Firm's Name)

**PROJECT: Wrestling Room Remodeling and Addition Project**

**TO:** The Willcox Unified School District (Owner)

1. In compliance with the Invitation for Bid and Instructions to Offerors, the Offeror named above hereby offers to furnish the materials and perform the Work for the Owner's Project designated above in strict accordance with the Terms and Conditions, Specifications, Schedules, Drawings, all other pertinent Contract Documents, and Offeror's own site verification of the project. The Offeror further agrees, upon written notice of acceptance of this Bid at any time within sixty (60) days after the date of opening of the bids, that Offeror will execute the Contract in accordance with the Bid as accepted, and give bond, as sufficient surety, in the amount of one hundred percent (100%) of the Contract Amount, within two (2) working days after a Notice of Award is presented for the following sums:

|  |                     |
|--|---------------------|
| <b>A. Base Bid:</b>                                  | <b>\$</b>           |
| B. Contingency Allowance                             | <b>\$ 25,000.00</b> |
| C.   | <b>\$</b>           |
| D.   | <b>\$</b>           |
| E. Miscellaneous "Unknown": Items (B + C)            | <b>\$</b>           |
| F. Total of A + D                                    | <b>\$</b>           |
| G. Cost of Performance Bond                          | <b>\$</b>           |
| H. Prime Tax   | <b>\$</b>           |
| (E + F + G) equals the <b>Total Bid Project Cost</b> | <b>\$</b>           |

2. Enclosed is bid security as required consisting \_\_\_\_\_ of in the amount of (\$ \_\_\_\_\_). (Not less than ten percent (10%) of the proposed Total Bid Project Cost, including all additive alternates.)
3. The Offeror hereby agrees that the above Base Bid includes a Cash Allowance of Zero and No/ 1 00 (\$0): If there are any funds remaining in the Cash Allowance after the Project has been fully completed, then upon final acceptance of the Project, the Contract Amount shall be reduced by the funds so remaining.
4. It is understood and agreed that the work under the Contract Documents shall be commenced by the Offeror, if awarded the Contract for the Project, on the date specified as the Start Date in the Notice to Proceed issued by the Owner in the manner specified in the Contract and General Conditions, and shall be completed by the Contractor by sunset, on the 120 days following the notice to proceed. Substantial completion shall be reached by sunset on the 90 days after notice to proceed. If the Work is not completed by these dates, then the Offeror shall pay the Owner the amount of one hundred and No/100 Dollars (\$100.00) per day as liquidated damages.
5. The Offeror offers the minimum workmanship warranty of 24 months: YES \_\_\_ NO \_\_\_
6. The Offeror understands that the Owner reserves the right to reject any or all Bids or to waive any formality or technicality, as determined by the Owner in its sole discretion, in any Bid in the interest of the Owner.

7. Provide a short Restatement of Work including product(s) being used to demonstrate understanding of the project:

8. The Offeror confirms a site visit and understands the conditions of the site, the full scope of the work, and related areas. YES \_\_\_ NO \_\_\_ If No, document that you will ask for no change orders as a result of not having made a site visit and thereby asking any questions that could have arisen.

9. Schedule based on Notice to Proceed through Substantial Completion: (Attached separately, if needed).

10. Are there any unresolved issues with your firm and the Register of Contractors? YES \_\_\_ NO \_\_\_  
If Yes, explain:

**BID BOND PURSUANT TO RULE R7-2-1102  
OF THE ARIZONA ADMINISTRATIVE CODE  
(SCHOOL DISTRICT PROCUREMENT RULES)  
(Penalty of this bond must be not less than 10% of the bid amount)**

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, \_\_\_\_\_ (hereinafter called the "Principal"), as Principal, and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_, with its principal office in the City of \_\_\_\_\_ (hereinafter called the Surety"), as Surety, are held and firmly bound unto Willcox Unified School District No.

20 (hereinafter called the ("Obligee") in the amount of \_\_\_\_\_ Dollars (\$\_\_\_\_\_), for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for \_\_\_\_\_

NOW, THEREFORE, if the Obligee shall accept the proposal of the Principal and the Principal shall enter into a contract with the Obligee in accordance with the terms of the proposal and give the bonds and certificates of insurance as specified in the standard specifications with good and sufficient surety for the faithful performance of the contract and for the prompt payment of labor and materials furnished in the prosecution of the contract, or in the event of the failure of the Principal to enter into the contract and give the bonds and certificates of insurance, if the Principal pays the Obligee the difference not to exceed the penalty of the bond between the amount specified in the proposal and such larger amount for which the Obligee may in good faith contract with another party to perform the work covered by the proposal, then this obligation is void. Otherwise, it remains in full force and effect; provided, however, that this bond is executed pursuant to the provisions of Ariz. Admin. Code Rule R7-2-1102, and all liabilities on this bond shall be determined in accordance with the provisions of the section to the extent as if it were copied at length herein.

The prevailing party in a suit on this bond shall recover as a part of his judgment such reasonable attorneys' fees as may be fixed by a judge of the Court.

Witness our hands this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

\_\_\_\_\_  
PRINCIPAL Seal

\_\_\_\_\_  
AGENCY OF RECORD By \_\_\_\_\_  
Title \_\_\_\_\_

\_\_\_\_\_  
Agency Address SURETY Seal  
By \_\_\_\_\_  
Title \_\_\_\_\_

**PERFORMANCE BOND PURSUANT TO R7-2-1103  
OF THE ARIZONA ADMINISTRATIVE CODE  
(SCHOOL DISTRICT PROCUREMENT RULES)  
(Penalty of this bond must be 100% of the Contract Amount)**

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, \_\_\_\_\_ (hereinafter called the "Principal"), as Principal, and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_, with its principal office in the City of \_\_\_\_\_ (hereinafter called the "Surety"), as Surety, are held and firmly bound unto Vail Unified School District No. 20, Pima County, Arizona (hereinafter called the "Obligee"), for the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, entitled Contract and General Conditions Between Owner and Contractor, dated the \_\_\_\_ day of \_\_\_\_\_, 2025 ("Contract"), to construct and complete certain work described as \_\_\_\_\_, which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of this obligation is such that if the Principal faithfully performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of the Contract during the original term of the Contract and any extension of the Contract, with or without notice to the Surety, and during the life of any guaranty required under the Contract, and also performs and fulfills all of the undertakings, covenants, terms, conditions and agreements of all duly authorized modifications of the Contract that may hereafter be made, notice of which modifications to the Surety being hereby waived, the above obligation is void. Otherwise, it remains in full force and effect.

Provided, however, that this bond is executed pursuant to the provisions of Arizona Administrative Code Rule R7-2-1103, and all liabilities on this bond shall be determined in accordance with the provisions of said Rule, to the extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

\_\_\_\_\_  
PRINCIPAL Seal

\_\_\_\_\_  
AGENCY OF RECORD By \_\_\_\_\_  
Title \_\_\_\_\_

\_\_\_\_\_  
Agency Address SURETY Seal  
By \_\_\_\_\_  
Title \_\_\_\_\_

**PAYMENT BOND PURSUANT TO R7-2-1103  
OF THE ARIZONA ADMINISTRATIVE CODE  
(SCHOOL DISTRICT PROCUREMENT RULES)  
(Penalty of this bond must be 100% of the Contract Amount)**

KNOW ALL PERSONS BY THESE PRESENTS:

THAT, \_\_\_\_\_ (hereinafter called the "Principal"), as Principal, and \_\_\_\_\_, a corporation organized and existing under the laws of the State of \_\_\_\_\_, with its principal office in the City of \_\_\_\_\_ (hereinafter called the "Surety"), as Surety, are held and firmly bound unto Willcox Unified School District No. 20, Pima County, Arizona (hereinafter called the "Obligee"), for the amount of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) for the payment whereof, the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors, and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, entitled Contract and General Conditions Between Owner and Contractor, dated the \_\_\_\_ day of \_\_\_\_\_, 2017 ("Contract"), to construct and complete certain work described as \_\_\_\_\_, which Contract is hereby referred to and made a part hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of this obligation is such that if the Principal promptly pays all monies due to all persons supplying labor or materials to the Principal or the Principal's subcontractors in the prosecution of the work provided for in the Contract, this obligation is void. Otherwise it remains in full force and effect.

Provided, however, that this bond is executed pursuant to the provisions of Arizona Administrative Code Rule R7-2-1103, and all liabilities on this bond shall be determined in accordance with the provisions, conditions and limitations of said Rule, to the extent as if it were copied at length in this agreement.

The prevailing party in a suit on this bond shall recover as part of the judgment reasonable attorney fees that may be fixed by a judge of the Court.

Witness our hands this \_\_\_\_\_ day of \_\_\_\_\_, 2025.

\_\_\_\_\_  
PRINCIPAL Seal

\_\_\_\_\_  
AGENCY OF RECORD By \_\_\_\_\_  
Title \_\_\_\_\_

\_\_\_\_\_  
Agency Address SURETY Seal  
By \_\_\_\_\_  
Title \_\_\_\_\_



## QUESTIONNAIRE

A. Provide the name and address of the primary contact person and servicing office location:

|   |  |
|---|--|
| Name  |  |
| Title   |  |
| Company Name  |  |
| Physical Address  |  |
| City, State and Zip                                       |  |
| Main Number   |  |
| Alternate or Cell Number                                  |  |
| Email Address   |  |
| AZ Construction License(s) ROC#<br><i>(attach copies)</i> |  |

B. Contractor is licensed and registered in State of Arizona for at least 5 years. YES \_\_\_\_\_ NO \_\_\_\_\_

C. Contractor has a minimum of 5 full time employees. YES \_\_\_\_\_ NO \_\_\_\_\_

D. Contractor has provided a list of previous projects with experience. YES \_\_\_\_\_ NO \_\_\_\_\_

E. Does your firm obtain current valid fingerprint clearance cards from employees? YES \_\_\_\_\_ NO \_\_\_\_\_

F. Does your firm perform criminal background checks on employees? YES \_\_\_\_\_ NO \_\_\_\_\_

G. Does your firm conduct random drug screens for employees? YES \_\_\_\_\_ NO \_\_\_\_\_

H. Are there any pending reviews or litigation involving your firm in the past five years? YES \_\_\_\_\_ NO \_\_\_\_\_  
If Yes, attached explanation.

I. Have you had any complaints filed with the Better Business Bureau in the last five years? YES \_\_\_\_\_ NO \_\_\_\_\_  
If Yes, attached explanation and details how the complaints were resolved?

J. List three (3) Arizona References of similar projects:

|    | District/Owner | Contact | Phone | Email | Contract Term |
|----|----------------|---------|-------|-------|---------------|
| 1. | _____          |         |       |       |               |
| 2. | _____          |         |       |       |               |
| 3. | _____          |         |       |       |               |

### OFFER AND ACCEPTANCE

Company Name: \_\_\_\_\_

Arizona Transaction (Sales) Privilege Tax License Number: \_\_\_\_\_

Federal Employer Identification Number: \_\_\_\_\_ Tax Rate: \_\_\_\_\_ %

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Title: \_\_\_\_\_

E-Mail: \_\_\_\_\_

Signature of Person Authorized to Sign Offer: \_\_\_\_\_

#### CERTIFICATION

By signature in the Offer section above, the Offeror certifies:

1. The submission of the offer did not involve collusion or other anti-competitive practices.
2. The Offeror shall not discriminate against any employee or applicant for employment in violation of Federal Executive Order 11246, State Executive Order 75-5 or A.R.S. §§ 41-1461 through 1465 et. seq.
3. The Offeror has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the submitted offer. Failure to provide a valid signature affirming the stipulations required by this clause shall result in rejection of the offer. Signing the offer with a false statement shall void the offer, any resulting contract and may be subject to legal remedies provided by law.
4. The Offeror complies and maintains compliance with the Federal Immigration and Nationality Act (FINA), A.R.S. §41-4401 and §23-214 which requires compliance with federal immigration laws by State employers, State contractors and State subcontractors in accordance with E-Verify Employee Eligibility Verification Program.
5. In accordance with A.R.S. §35-391, the Offeror does not have scrutinized business operations in Sudan.
6. In accordance with A.R.S. §35-392, the Offeror is in compliance and shall remain in compliance with the Export Administration Act.
7. In accordance with A.R.S. §35-393, the Offeror does not have scrutinized business operations in Iran.
8. In accordance with A.R.S. §15-512, the Offeror shall comply with fingerprinting requirements unless otherwise exempted.
9. By submission of this bid, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
10. By submission of this bid, that no Federal appropriated funds have been paid or will be paid by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of a Federal contract, the making of a Federal grant, the making of a Federal loan, the entering into a Cooperative Agreement, and the extension, continuation, renewal, amendment, or modification of a Federal contract, grant, loan, or cooperative agreement.
11. In accordance with A.R.S. §§ 35-393, the Offeror is not currently engaged in, and agrees for the duration of the contract not to engage in, a boycott of Israel.

Contract Title: High School Wrestling Room Remodeling and Addition Project

#### ACCEPTANCE OF OFFER

The Proposal is hereby accepted. The Contractor is now bound to sell the materials or services listed by the attached contract and based upon the solicitation, including all terms, conditions, specifications, amendments, etc., and the Contractor’s Proposal as accepted by the School District/Public Entity.

This contract shall henceforth be referred to as Contract No **IFB 4-2025-02**. The Contractor is cautioned not to commence any billable work or to provide any material or service under this contract until Contractor receives a purchase order, contract release document, or written notice to proceed.

Awarded this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
Kevin Davis, Director of Business

## CONFIDENTIAL/PROPRIETARY SUBMITTALS

Confidential/Proprietary Submittals (mark one):

\_\_\_\_\_ No confidential/proprietary materials have been included with this offer.

\_\_\_\_\_ Confidential/Proprietary materials included. Offerors should identify below any portion of their offer deemed confidential or proprietary (see Uniform General Terms and Conditions, paragraph 17).

Identification in this section does not guarantee that disclosure will be prevented but that the item will be subject to review by the Offeror and the District prior to any public disclosure. Requests to deem the entire offer or price as confidential will not be considered. The School District/Public Entity will not consider pricing to be confidential or proprietary.

---

\_\_\_\_\_  
Firm

\_\_\_\_\_  
Authorized Signature

### CONFLICT OF INTEREST

The undersigned, the owner or authorized officer of \_\_\_\_\_  
 (the "Firm"), Hereby represent and warrant to their best knowledge that no familial relationships exist  
 between the owner(s) or any employee of the company and any member of the Governing Board of the  
 Willcox Unified School District , Superintendent of the Willcox Unified School District , any employee  
 of the  
 Willcox Unified School District , or any employee of Swaim Associates.

\_\_\_\_\_ **YES**    \_\_\_\_\_ **NO** If NO, disclose relationship(s) below.

\_\_\_\_\_  
 Name Print

\_\_\_\_\_  
 Authorized Signature

\_\_\_\_\_  
 Date

Offeror/Employee Name

Name of District Employee

Relationship

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**NON-COLLUSION AFFIDAVIT**

State of )  
 )  
County of ) ss.

\_\_\_\_\_, affiant,  
(Name)

the \_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Contractor/Offeror)

The persons, corporation, or company who makes the accompanying bid, having first been duly sworn, deposes and says:

That such bid is genuine and not sham or collusive, nor made in the interest of, or behalf of, any persons not herein named, and that the Offeror has not directly or indirectly induces or solicited any other Offeror to put in a sham bid, or any other person, firm or corporation to refrain from bidding, and that the Offeror has not in any manner sought by collusion to secure for itself an advantage over any other Offeror.

\_\_\_\_\_  
\_\_\_\_\_  
(Title)

Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_.

\_\_\_\_\_  
Signature of Notary Public in and

for the County of

\_\_\_\_\_ State of

\_\_\_\_\_

## DEVIATIONS AND EXCEPTIONS

Offerors shall indicate any and all exceptions taken to the provisions or specifications in this solicitation document. Exceptions (mark one):

\_\_\_\_\_ No exceptions

\_\_\_\_\_ Exceptions taken (describe below – attach additional pages if needed)

---

\_\_\_\_\_  
Firm

\_\_\_\_\_  
Authorized Signature



Form **W-9**  
 (Rev. November 2017)  
 Department of the Treasury  
 Internal Revenue Service

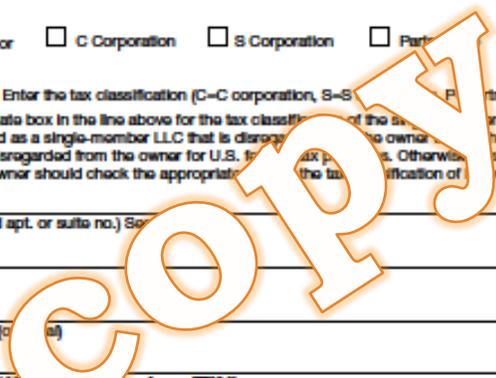
## Request for Taxpayer Identification Number and Certification

**Give Form to the  
 requester. Do not  
 send to the IRS.**

▶ Go to [www.irs.gov/FormW9](http://www.irs.gov/FormW9) for instructions and the latest information.

Print or type.  
 See Specific instructions on page 3.

|  |
|--|
| 1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.  |
| 2 Business name/disregarded entity name, if different from above   |
| 3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes.<br><input type="checkbox"/> Individual/sole proprietor or single-member LLC<br><input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____<br><small>Note: Check the appropriate box in the line above for the tax classification of the business or owner. Do not check the box for a single-member LLC if the LLC is classified as a single-member LLC that is disregarded from the owner for U.S. tax purposes. Otherwise, if the LLC is a single-member LLC that is not disregarded from the owner for U.S. tax purposes, the tax classification of the owner.</small><br><input type="checkbox"/> Other (see instructions) ▶ _____<br><input type="checkbox"/> C Corporation<br><input type="checkbox"/> S Corporation<br><input type="checkbox"/> Partnership<br><input type="checkbox"/> Trust/estate |
| 4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3):<br>Exempt payee code (if any) _____<br>Exemption from FATCA reporting code (if any) _____<br><small>(Applies to accounts maintained outside the U.S.)</small>  |
| 5 Address (number, street, and apt. or suite no.) See instructions for details   |
| 6 City, state, and ZIP code  |
| 7 List account number(s) here (optional)   |
| Requestor's name and address (optional)  |



### Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN*, later.

**Note:** If the account is in more than one name, see the instructions for line 1. Also see *What Name and Number To Give the Requester* for guidelines on whose number to enter.

|  |  |  |  |   |   |  |  |   |   |   |  |  |  |  |  |
|--|--|--|--|---|---|--|--|---|---|---|--|--|--|--|--|
| <b>Social security number</b>  |  |  |  |   |   |  |  |   |   |   |  |  |  |  |  |
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| OR   |  |  |  |   |   |  |  |   |   |   |  |  |  |  |  |
| <b>Employer identification number</b>  |  |  |  |   |   |  |  |   |   |   |  |  |  |  |  |
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### Part II Certification

Under penalties of perjury, I certify that:

1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
3. I am a U.S. citizen or other U.S. person (defined below); and
4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

**Certification Instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

**Sign Here**

Signature of U.S. person ▶

Date ▶

### General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

**Future developments.** For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to [www.irs.gov/FormW9](http://www.irs.gov/FormW9).

### Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-INT (interest earned or paid)

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

*If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What Is backup withholding, later.*

**CUT ALONG THE LINE AND AFFIX TO THE FRONT OF YOUR BID CONTAINER**

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# **SEALED BID**

**Do not open this package until the due date and time listed below**

**Submitted by:**

Company Name:

Address:

City, State, Zip:

**Deliver To:**

Willcox School District Administration

480 N. Bisbee Ave

Willcox, AZ 85643

**IFB 4-2025-02: High School Wrestling Room Remodeling and Addition Project**

**Opening Date: December 18,2025 at 2:00 p.m. Local AZ Time\***

\*bids received after this date and time will not be opened

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**CUT ALONG THE LINE AND AFFIX TO THE FRONT OF YOUR BID CONTAINER**

**DIVISION 1 - GENERAL REQUIREMENTS**

**010100 COMPLETION OF WORK AND SPECIAL PROVISIONS**

The Contractor shall provide and pay for all materials, labor services, tools, and other items necessary to complete the Project as specified and shown on the drawings. All materials shall be new, and both workmanship and materials shall be of good quality. All workmen and subcontractors shall be skilled in their trades. The Contractor shall be responsible for safe, proper, and lawful construction and shall construct in the best and most workmanlike manner a complete project reasonably implied. The Contractor shall protect the work and be responsible for any damage or injury due to his act or neglect. The Contractor shall keep the premises free from accumulation of waste materials at all times. Measurements must be taken on the job before erection or fabrication. Extra compensation will not be allowed because of differences between job and drawings that have not been brought to the attention of the Architect in writing before starting the work. Mention in the specifications or indication on the drawings of articles, materials, operations, or methods requires that the Contractor provide each item mentioned, perform each operation and provide all necessary labor, equipment, and incidentals.

1. PROJECT SCHEDULE:

The project shall be completed as follows:

- A. Start Date: April 1, 2026
- B. Substantial Completion Dates:
  - a. Wrestling Room October 1, 2026

2. GENERAL NOTES:

- A. Smoking and all other tobacco products are not allowed on campus.
- B. Before the project will be classified as "final completion," the Contractor will develop and complete a punch list. The Owner and Architect will determine when the project meets "final completion." A punch list must be established and completed within the project calendar day time frame.

END OF SECTION

**010300 ADDITIVE ALTERNATES**

Refer to the drawing cover sheet for list of Additive Alternates.

- 1. The scope of Work for all Alternates shall be in accordance with applicable Drawings and Specifications.

2. Each Alternate is intended to cover all of the work required for a complete finished job.
3. Coordinate related Work and modify surrounding Work as required to properly and completely integrate the Alternates into the Work.
4. The Base Bid and the Alternates are exclusive in their scope of work. There is no overlap between or among the Base Bid and Alternates. The cost of any item of work shall be included only once, in the Base Bid or in the Alternates.

END OF SECTION

#### **010400 SUPERINTENDENCE**

The Contractor shall keep on his work a competent superintendent satisfactory to Architect. The superintendent shall not be changed except with the consent of the Architect, unless the superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. The superintendent shall represent the Contractor in his absence and all directions given to him shall be as binding as if given to the Contractor. Important directions shall be confirmed in writing to the Contractor. Other directions shall be so confirmed on written request in each case.

END OF SECTION

#### **010410 WORK BY OTHERS**

The following work shall be furnished and installed by others under separate contract with the Owner. Contractor shall allow access to the site and adequate space for storage of materials and equipment, cooperate and coordinate with Owner to accommodate the work within the specified time period. Responsibility for related work under this contract is noted. Where facilities are to be provided for rough-in only, under this contract, he shall verify requirements before proceeding with the work. Such items are as follows:

1. Select Low Voltage Systems

END OF SECTION

#### **010430 CLAIMS FOR EXTRA COST**

If the Contractor claims that any instructions by drawings or otherwise involve extra cost under this contract, he shall give the Architect written notice thereof after the receipt of such instructions and in any event before executing the work. Submit a

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detailed cost breakdown with quantities and unit prices. No such claim will be valid unless so made. Cost of extra work shall be established and approved by the Architect before executing the work.

END OF SECTION

**010950 REFERENCES**

References to standard specifications and codes shall mean latest published edition at date of contract.

END OF SECTION

**010960 CONTRACT DOCUMENT CLARIFICATIONS**

Prior to commencing work, Contractor shall carefully examine the drawings, visit the site of work, and fully inform himself of all existing conditions and limitations excepting in underground and inaccessible locations. Should the Contractor, at any time during the course of this project, become aware of any inconsistencies, errors, omissions, or conflicts in drawings, specifications, codes, ordinances, or existing conditions, he shall notify the Architect in writing to request clarification direction. In the event of failure to notify the Architect, the Contractor shall correct any deficiencies resulting therefrom as directed by the Architect at no extra cost.

END OF SECTION

**010970 WORKMANSHIP**

If, in Contractor's opinion, any work is shown on drawings or specifications in such a manner to make it impossible to produce a high caliber of workmanship, such conditions shall be referred to Architect for clarification. Failure to notify Architect of such conditions and proceeding with work shall be cause for rejection of work and must be reworked or reinstalled in acceptable manner at no extra cost to Owner. Should conflict occur between drawings and specifications, Contractor shall be deemed to have estimated the more expensive way, unless certified in writing by Architect. Cutting or repairing work in place necessary because of progress of work or negligence of Contractor shall be paid for by the Contractor responsible for the work in progress or the negligence.

END OF SECTION

**010980 PERMITS**

Utility connection fees shall be paid for the Owner. All other permits shall be paid for by the Contractor using the allowance.

END OF SECTION

**011000 REGULATIONS AND STANDARDS**

1. Conform to all codes and regulations having jurisdiction over this project, including International Building Code, local codes, and applicable mechanical and electrical codes.
  - A. Regulations: Comply with requirements of local laws and regulations covering 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.
    - (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 governing use of water and energy, and the control of dust, noise, and other nuisances.
  - B. Standards:
    - (1) Comply with the requirements of NFPA Code 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."
    - (2) Refer to "Guidelines for Bid Conditions for Temporary Job Utilities and Services", as prepared jointly by AGC and ASC for industry recommendations.

END OF SECTION

**011100 DEFINITIONS**

"Or (approved) equal" shall mean approved as an equal in opinion of Architect prior to bid. "Approved" shall mean approved in writing by Architect. "As required" shall mean as required by competent construction practices. "As acceptable" shall mean acceptable by Architect. "As recommended" shall mean as recommended by Manufacturer.

END OF SECTION

**011200 CONTRACTOR'S LICENSE LAW**

Contractor shall comply with, and require all subcontractors to comply with, State and City Contractor's License Law and to be duly registered and licensed thereunder.

END OF SECTION

**011300 SPECIFICATION HEADINGS**

For convenience of reference, these specifications are separated into titled divisions. Such separations shall not operate to make the Architect or Owner an arbitrator to establish limits to the contracts between Contractor and subcontractors.

END OF SECTION

**013300 SHOP DRAWINGS AND SAMPLES**

Contractor shall supply the Architect with a schedule of all shop drawings to be submitted. Submit samples where required. Approved sample shall constitute example of work expected of entire project. All submissions are through General Contractor and shall be stamped, reviewed, and approved by the Contractor prior to submitting to the Architect. The Contractor shall not proceed with work until submittals are approved.

Review is for general conformance with the design concept and contract documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the contract plans and specifications or departure therefrom. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, for techniques of construction and assembly, for coordination of his work and that of all other trades, and for performing his work in a safe and satisfactory manner.

1. Shop Drawings:
  - A. Submit one (1) electronic copy for annotation and correction by Architect. One (1) hard copy may be requested in addition to the electronic copy for certain submittals.
  - B. All submittals shall have an 8.5" x 11" cover sheet indicating the type of submittal and project name. The remainder of the sheet shall be reserved for approval stamps from Contractor, Architect, and Consultants.

2. Materials List and Literature:

- A. Manufacturer's literature and materials' lists shall be submitted electronically. All color selection information shall be submitted in hard copy form or with actual samples for review.
- B. Manufacturer's literature shall be labeled to indicate the name of the project, manufacturer, brand or other identification where required. In addition, catalogues shall be marked to indicate the specific items submitted for approval.
- C. The right is reserved to require submission of samples of any material, and any materials' lists, whether or not specifically mentioned herein.

END OF SECTION

**013310 COST BREAKDOWN AND PROGRESS SCHEDULE**

After construction contract is awarded, Contractor shall provide a breakdown of his costs into categories, and an estimated schedule of progress in graph form. The schedule shall be updated monthly.

END OF SECTION

**013345 PRIOR APPROVAL REQUESTS**

All prior approval requests must include documentation which clearly indicates the differences in specification between the requested prior approval and the base specification. A sample manufacturer's warranty and a product sample is required where applicable. All prior approval requests must be received by the Architect with the time limits prescribed in the instructions to bidders. Requests received after that time will not be considered.

END OF SECTION

**015000 TEMPORARY FACILITIES**

The Contractor shall provide temporary field office, telephone, and restroom facilities. Connections for temporary power and water shall be by the contractor. Power and water shall be paid for by the Owner.

END OF SECTION

**015100 SITE PROTECTION**

No existing trees or other vegetation shall be removed, trimmed, or damaged without approval of the Architect. Vegetation located in the vicinity of construction shall be tagged, fenced off, and/or tied back for protection. Portions of the site not affected by new construction shall remain undisturbed.

END OF SECTION

#### **015150 TEMPORARY ENCLOSURES, BARRIERS AND FENCES**

1. Provide and maintain all fences, barricades, lights, shoring and other protective structures or devices necessary for the safety of workmen, equipment, the public, and property as required by state or municipal laws and regulations, local ordinances, laws, and other requirements of the county, state, and other authorities having jurisdiction with regard to safety precautions, operation, and fires hazards.
2. Provide 6 foot high woven wire temporary fencing around the construction area. Fencing shall be erected and secured in a manner to withstand the forces to which it may be subjected. Locate gates for access to the areas as required. Close and lock all gates after normal working hours. Barbed wire is not permitted on fencing.
3. Protect all elements of construction from any danger of damage from wind, rain, dust, frost, freezing temperatures, or other infiltration of weather.

END OF SECTION

#### **015200 SECURITY**

The Architect and the Owner do not assume any responsibility, at any time, for the protection of construction areas and premises, or for loss of materials, from the time that the contract operations have commenced until the final acceptance of the work by the Architect and Owner. If watchman service is deemed necessary by the Contractor, such protection shall be provided and paid for by the Contractor.

END OF SECTION

#### **015250 NOISE AND DUST CONTROL**

Exercise all possible care to control excessive noise and dust during the construction to keep these problems to a minimum. Traffic or construction areas shall be sprinkled with water or chemicals as required and in accordance with applicable County requirements. The contractor shall pay for and provide all water necessary to minimize dust during the project.

END OF SECTION

## **016000 MATERIALS**

Each Contractor is responsible for proper care of his materials and equipment until date of acceptance of work. Materials damaged or destroyed shall be removed and replaced with new materials. All materials shall be new unless noted otherwise. Installation of materials over sub-surface will be considered as acceptance of sub-surface by materials applicator.

END OF SECTION

## **017700 PROJECT CLOSEOUT**

1. General:
  - A. Related Documents:
    - (1) Drawings and general provisions of Contract, including General Conditions and other Division-1 Specification Sections, apply to this Section.
2. Summary:
  - A. This section specifies administrative and procedural requirements for project closeout including, but not limited to, the following:
    - Review procedures
    - Project record document submittal
    - Operating and maintenance manual submittal
    - Submittal of warranties
    - Final cleaning
3. Substantial Completion:
  - A. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List exceptions in request.
    - (1) In the Application for Payment that coincides with, or follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete. Include supporting documentation for completion as indicated in these Contract Documents and as statement showing an accounting of changes to the Contract Sum.
    - (2) If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and

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reasons the Work is not complete.

- (3) Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
- (4) Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar final record information.
- (5) Deliver extra stock and similar items.
- (6) Complete final clean-up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- (7) The Owner's Representative will repeat review when requested and assure that the Work has been substantially completed.
- (8) Results of the completed review will form the basis of requirements for final acceptance.

4. Final Acceptance

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

- (1) Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
- (2) Submit an updated final statement, accounting for final additional changes to the Contract Sum.
- (3) Submit consent of surety to final payment.

B. Re-inspection Procedure: The Owner's Representative will again review the Work upon receipt of notice that the Work, including review list items from earlier reviews, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Owner's Representative.

5. Record Document Submittals

A. General: Do not use record documents for construction purposes;

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protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Owner's Representative's reference during normal working hours.

- B. Record Drawings: Maintain a clean, undamaged set of prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.

Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.

Note related Change Order numbers where applicable.

Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates, and other identification on the cover of each set.

If digital copies of record drawings in PDF format are used, provide one (1) hard copy set to Owner as well as three (3) digital copies.

- C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda, and one copy of other written construction documents such as Change Orders and modifications issued during construction. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications. Give particular attention to substitutions, selection of options, and similar information on elements that are concealed or cannot otherwise be readily discerned later by direct observation. Note related record drawing information and Product Data.

Upon completion of the Work, submit record Specifications to the Owner's Representative for the Owner's records.

- D. Record Product Data: Maintain one copy of each Product Data submittal. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site, and from the

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manufacturer's installation instructions and recommendations. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation. Note related Change Orders and mark-up of record drawings and Specifications.

- E. Maintenance Manuals: Provide three (3) hard copies and two (2) electronic copies of all **O&M Manuals** for equipment and products installed during the construction or remodeling project. Organize operating and maintenance data into suitable sets of manageable size. All of the close out documents are to be placed in a white three ring binder which has a see-through front panel and binding edge that allows a sheet to be installed as a title sheet.

All information shall be installed in a proper indexed individual heavy-duty 2-inch, 3-ring vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Table of Contents is to be typed and installed.

All notebooks are to have divisions for each of the categories as listed below. Include the following types of information.

- (1) Provide a copy of all maintenance parts and supplies required to maintain building operations for a year or through normal maintenance cycle. Examples would be filters, lamp schedule, etc.
- (2) Provide copies of all shop drawings and product **Cut Sheets** for all brand names of major items used on the project, such as light fixtures, electrical switch gear, HVAC units, fans, coils, etc.
- (3) Provide all **Letters of Warranty** for installation and project.
- (4) Provide a **listing of all Sub-Contractors** performing work on the project and their responsibility during the project.
- (5) Provide any and all Regulatory Documents, i.e., permits, air inspections, waste manifest, etc. that applies to the project, or were part of the project during the construction or remodeling phases, that are required by Federal, State, Local Code, and/or Regulatory Agencies.
- (6) Provide a copy of **Record Drawings** for project.

6. Closeout Procedures

A. Final Cleaning:

- (1) General: General cleaning during construction is required.
- (2) Cleaning: Clean the site, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.
- (3) Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

END OF SECTION

**017710 CLEAN-UP**

The job site work area shall be clean and orderly at all times. Upon completion, leave work in clean condition. Each subcontractor responsible for removal of debris caused by his work. Contractor shall do the following cleaning:

1. Clean all tire marks off of sidewalks and concrete paving in project area.
2. Glass: Remove putty, stains, etc. and wash and polish all glass, both sides.
3. Painted, Decorated, and Stained Work: Remove all marks, stains, fingerprints, and other soil and dirt. Touch-up as required.
4. Hardware and Metal Surfaces: Clean all hardware and metal surfaces.
5. Tile and plumbing fixtures: Clean and polish; seal tile grout.
6. Clean all finger prints off finished surfaces – walls, ceilings, millwork, etc.
7. Carpet: Vacuum and remove any spots.
8. Concrete floors: Clean and polish.

END OF SECTION

**017720 ADDITIONAL MATERIALS FOR OWNER MAINTENANCE**

Upon completion of the project, the Contractor shall furnish the Owner with containers of each of the following items of material of each color or type used in the job:

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1. Paints and stains: 1 unopened gallon, each color.
2. Rubber base: 50 linear feet, each color.
3. Ceramic tile: 1 box, each type and color.
4. Acoustical lay-in panels: 12 panels in an unopened carton, each type.

The above materials shall not be utilized by the Contractor for repairs or replacement prior to final acceptance of the project by the Owner.

END OF SECTION

**017740 GUARANTEE**

Contractor shall guarantee his work for a period of **two years**, or a longer period when so specified, from date of final acceptance. Should defects develop within guarantee period due to faults in materials and/or workmanship, Contractor shall make all repairs and do all necessary work to Architect's satisfaction without cost to Owner within ten days after notice to Contractor. If Contractor fails to do work so ordered, Owner may have work done and charge cost thereof against monies retained and, if said monies shall be insufficient to pay such cost or money available, Contractor and his sureties agree to pay Owner for such work. Nothing herein intends or implies that guarantee shall apply to work which has been abused or neglected by the Owner.

END OF SECTION  
END OF DIVISION

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**DIVISION 3 - CONCRETE**

**031000 CONCRETE FORMWORK**

1. GENERAL:

A. Description of Work

- (1) Work as evident on drawings and specified herein or required for furnishing all labor, materials, equipment and services necessary for installation of formwork, complete in conjunction with Section 033000 Cast-In-Place Concrete.

B. Related Work

- (1) Section 032000: Concrete Reinforcing Steel
- (2) Section 033000: Cast-In-Place Concrete.

C. Standards

- (1) Formwork shall conform to the latest edition of the following standards and to the drawings and specifications:
  - a. ACI 347 American Concrete Institute – Recommended Practice for Concrete Formwork.
  - b. ACI SP-40 American Concrete Institute - Formwork for Concrete.
  - c. ASTM American Society for Testing and Materials Standards.

D. Formwork Design

- (1) The Contractor shall assume all responsibility for the safety of the formwork and shall provide all necessary design, construction, materials, and maintenance to produce the required concrete work safely. Design all formwork to have sufficient camber to maintain the tolerances specified. Strength shall be sufficient to compensate for the weight of the fresh concrete and a construction live load of 50 psf minimum.

2. PRODUCTS:

A. Form Facing Materials

- (1) Concrete surfaces to be left exposed at completion of work:  
PLYFORM Class I or II B-B EXT-DFPA conforming to the U.S.

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Product Standard PS I for Softwood Plywood.

- (2) Concrete surfaces to be left unexposed at completion of work: Plywood or boards capable of producing finished surfaces that are reasonably true to line and plan.

B. Form Ties

- (1) Continuous single member and internal disconnecting.

C. Form Release Agent

- (1) Nonstaining, free from lubricating, conventional form and diesel oils, or kerosene; a chemically active form release agent that will not impair bonding of plaster, paint or cement coatings to concrete surfaces.

D. Metal Dovetail Anchor Slots

- (1) Machine fabricated from at least 24 gage steel hot-dip galvanized slot completely filled with removable filler, standard size, and lengths as required by work.

3. EXECUTION:

A. Forms

- (1) For plywood formed surfaces to be left exposed at the completion of the work, use 5/8" or thicker plywood with joints true, level and taped or caulked to prevent leakage of cement paste, and locate form ties level and plumb in horizontal rows and vertical tiers.
- (2) Concrete surfaces that will remain exposed at completion of the work shall be formed as specified, as shown on Drawings, and in such a manner that the exposed surfaces require a minimum of reworking to be acceptable to the Architect. Forms shall be sufficiently tight to prevent leakage of cement paste. Flashes of concrete that occur between abutting edges of plywood forms shall be removed.
- (3) Allowable Tolerances: In accordance with requirements of ACI 347, paragraph 3.3.1; mass concrete in accordance with ACI 347, Paragraph 3.3.

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B. Accessories

- (1) Install accurately and firmly in forms all inserts and embedded items as shown on Drawings, as required to support or fasten the work of other trades, as provided and located by other trades, and as necessary to complete the work. Secure them against displacement during concreting.

C. Anchors

- (1) Install metal dovetail anchor slots vertically in forms, where masonry is not tied to concrete by reinforcing bars, as shown on Drawings.

D. Removal of Forms

- (1) Forms shall be removed only with the approval of Architect and in a manner to insure complete safety of the structure. In no case shall the supporting forms or shoring be removed until the members have acquired sufficient strength to support safely their weight and the load thereon. The results of suitable control tests may be used as evidence that the concrete has attained such sufficient strength.

END OF SECTION

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## **032000 CONCRETE REINFORCING STEEL**

### **1. GENERAL:**

#### **A. Description of Work**

- (1) Work as evident on the drawings and specified herein or required for furnishing all labor, materials, equipment, and services necessary for the installation of reinforcement complete, in conjunction with Section 033000 Cast-In-Place Concrete.

#### **B. Related Work**

- (1) Section 033000: Cast-In-Place Concrete.
- (2) Drawings: General Structural Notes.

#### **C. Submittals**

- (1) Certificate: Mill certificate of compliance shall be provided for all reinforcing steel.
- (2) Shop Drawings: Furnish shop drawings in accordance with Section 013300 Shop Drawings and Samples showing all reinforcing steel bending and assembly diagrams, splicing, laps or rods, shapes, dimensions and details. Shop drawings shall be approved before fabrications.
  - a. In reviewing shop drawings, the Architect / Engineer will attempt to detect omissions and majors errors, but neither failure of the Architect / Engineer to do this nor the review of the shop drawings shall relieve the Contractor of their responsibility to comply with the Drawings and Specifications.

#### **E. Standards**

- (1) Detailing, fabrication and placing of all reinforcing steel shall conform to the latest edition of the following standards and to the Drawings and Specifications.
  - a. IBC International Building Code, Chapter 21, Masonry; and Chapter 19 Concrete.
  - b. ACI 315 American Concrete Institute-Manual of Standard Practice for Detailing Reinforced Concrete Structures.
  - c. ACI 318 American Concrete Institute-Building Code Requirements for Reinforced Concrete.

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- d. ICBO Research Recommendation Report
- e. ASTM American Society for Testing and Materials Standards, latest editions.

2. PRODUCTS:

A. Reinforcement

- (1) Reinforcing Steel: ASTM A615 with supplement (SI), marked "S" and as follows: Grade 40 for Numbers 3 thru 4; Grade 60 for Numbers 5 thru 18.
- (2) Tie Wire: ASTM A82, 18 gage black annealed wire.
- (3) Dowel Bar Splicers and Dowel-Ins: As manufactured by the Richmond Screw Anchor Co., or approved equal, with a minimum rated tensile capacity of 150% of the yield strength for grade 60 steel. Dowel-ins shall have enlarged ends so that the cross-sectional area of bar is not reduced for threading.

B. Accessories

- (1) Spacers, ties, chairs and other devices as required for placing spacing, supporting and fastening reinforcement.

3. EXECUTION:

A. Accessories

- (1) Contractor shall supply all necessary wiring, chairs, bolsters, supports, and support bars, to put the reinforcement in place, fasten it securely, and keep it in place while concrete is being poured. Spacers, chairs, ties, and other accessories conforming to the American Concrete Institute Standards shall be furnished and installed to hold the bars in position. Chairs in sufficient number to prevent sagging and to support any pedestrian traffic during construction shall be used, but in no case less than that shown in the "Standard Number and Location of Accessories" in ACI 315.

B. Placement

- (1) Metal reinforcement shall be free from scale, rust and other coatings which destroy bond. Metal reinforcement shall not be straightened or re-bent in a manner which will injure the material. Bars with kinks or bends not shown on the plans shall not be used.

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- (2) On any vertical construction joint in the work where horizontal bars extend beyond the construction joint, the forms or head against which the work ends shall be perforated at the proper places to allow the bars to project through.
- (3) Unless otherwise indicated on the plans, reinforcement shall be so placed as to provide a protective concrete covering in accordance with ACI 318. The bars shall be cut and bent as required and wired together. All bending shall be accurately done, as shown on the plans and by methods and appliances approved by the Architect. Adjoining bars and splices shall be per drawings but not less than at least 36 diameters in concrete, 48 diameters in masonry, and not less than 2'-0".
- (4) Splices and laps shall be in accordance with plans. Necessary splices not shown on the Drawings shall be lapped sufficiently to develop the strength of the bar by bond and securely wired location shall be approved by the Architect.
- (5) The clear distance between reinforcing bars shall not be less than 1-1/3 times the maximum size of coarse aggregate or 1 inch absolute minimum.
- (6) All horizontal reinforcing in concrete shall be continuous around corners or corner bars shall be provided. Where bars of different sizes intersect at corners, corner bars of the larger size shall be provided.

END OF SECTION

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**033000 CAST-IN-PLACE CONCRETE**

1. GENERAL:

A. Description of Work

- (1) Work as evident on the Drawings and specified herein or required for furnishing all labor, materials, equipment, and services necessary to complete all cast-in-place concrete work.

B. Related Work

- (1) Drawings: General Structural Notes
- (2) Section 031000: Concrete Formwork
- (3) Section 032000: Concrete Reinforcing Steel

C. Submittals

- (1) Certificates: Cement will be accepted on the basis of the manufacturer's certification of compliance, accompanied by mill test reports, that cement meets the physical and chemical requirements of the specification under which furnished.
- (2) Mix Design: Concrete mix design.

D. Standards

- (1) Concrete work shall conform to the latest edition of the following Standards and to the Drawings and Specifications for the construction of Concrete Work:
  - a. IBC International Building Code, Chapter 19, Concrete.
  - b. ICBO Research Recommendation Report.
  - c. ACI 318 American Concrete Institute – Building Code Requirements for Reinforced Concrete.
  - d. ASTM American Society for Testing and Materials Standards.

E. Quality Control - Field Tests of Concrete

- (1) All quality control testing during construction, if required by the Architect or Engineer, shall be paid for by the Owner and accomplished by the Geotechnical Laboratory of record that prepared the original report. In the event any retesting is required due to the failure of materials to meet specifications limits, the

Contractor shall pay for all such retesting.

- (2) Compressive Strength Tests: ASTM C39; one set of samples of each class of concrete placed each day shall be taken not less than once a day, nor less than once for each 150 cubic yards of concrete, not less than once for each 5,000 square feet of surface area for slabs or walls; one sample tested at 7 days, two samples tested at 28 days. Additional samples for early strength or 56 day testing shall be paid for by the Contractor. Testing of mixes shall be paid for by the Owner and accomplished by an accredited testing laboratory approved by the Architect.
- (3) When tests of laboratory cured cylinders fail to meet specified requirements, the Contractor shall change proportions of water-cement ratio to increase the strength to the specified value, as directed by the testing laboratory.
- (4) If any strength test of laboratory-cured cylinders falls below required  $f'_c$  by more than 300 psi, if there is evidence that quality of concrete is below specification requirements, or if tests of field-cured cylinders indicate deficiencies in protection and curing, steps shall be taken by the Contractor to assure that load-carrying capacity of the structure is not jeopardized.
  - a. When load tests indicate that concrete does not meet specifications, measures as prescribed by the Architect shall be taken by the Contractor to correct the deficiency at no additional expense to the Owner.

F. Embedded Items

- (1) Full cooperation shall be given other trades to install embedded items. Suitable templates or instructions, or both, will be provided for setting items placed in the forms. Embedded items shall have been completed and approved before concrete is placed.

2. PRODUCTS:

A. Cement

- (1) Portland Cement Type II, conforming to ASTM C150 and shall be properly protected from weather.

B. Aggregate

- (1) Sand (fine aggregate) shall be hard, clean, screened, and washed sand. Gravel (coarse aggregate) shall be sound, clean, and

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durable particles and graded between the limits for size No. 57. Aggregates shall be free from clay, loam, organic or foreign substances, and shall conform to the requirements of ASTM C33.

C. Water

- (1) Clean, fresh and free from harmful acids, alkalis, oils, and organic substances.

D. Expansion Joint Filler

- (1) Resin impregnated fiberboard conforming to physical requirements of ASTM D1752, 1/2-inch unless otherwise indicated.

OR

- (2) Sponge rubber, preformed, nonextruding, cement gray color; ASTM D1752, Type 1; 1/2-inch thick unless otherwise indicated.

E. Membrane-Forming Curing Compound

- (1) Products complying with ASTM C309, Type I include the following:
  - a. Burke "Res-X Clear Resin Base: Or equal at floor surfaces to receive paint, resilient floor covering, or other bonded finish to slab.
  - b. Burke "Cure Clear Wax Base" or equal at floor surfaces to receive natural concrete finish.
- (2) Apply curing compounds in accordance with manufacturer's instructions.

F. Admixtures

- (1) Subject to prior approval by the Architect. The admixtures shall be shown capable of maintaining the same composition and performance throughout the work as the product used in establishing concrete proportions in accordance with ACI 318, Section 5. Calcium chloride or any admixture containing chloride ions shall not be used. Fly Ash shall not be allowed in mortar or grout. Fly Ash for concrete shall be Class F conforming to ASTM C618 and shall not replace more than 20% cement by weight.

G. Concrete Water Admixture

Interior concrete floor slabs shall have one of the following waterproofing admixtures or an approved equal

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- (1) AConcure@ by Concure Corporation (1-800-925-7746)
- (2) ADarapel@ by W.R. Graw & Co. (1-602-233-12976)
- (3) ARheomix 235" by Master Builders Technologies (1-800-628-9990)

H. Chemical Hardener

- (1) Colorless aqueous solution containing a blend of magnesium fluosilicate combined with a wetting agent, containing not less than two pounds of fluosilicates per gallon.

I. Moisture-Retaining Cover

- (1) One of the following, complying with ASTM C171:
  - a. Waterproof paper.
  - b. Polyethylene film CS 238 at least 6 mils thick.
  - c. Polyethylene-coated burlap.

J. Non-Slip Abrasive Aggregate

- (1) Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rust-proof and non-glazing, and is unaffected by freezing, moisture and cleaning materials.

K. Grout-Non-Shrink, Non-Metallic

- (1) Grout for column and beam bearings, "Five Star Grout" as manufactured by U.S. Grout Corp., Old Greenwich, Conn.

L. Drill-In Expansion Anchors

- (1) The anchors shall be a non-drilling type per the general structural notes. Anchors require Special Inspection by Testing Laboratory.

M. Non-Structural Fill Concrete

- (1) Fill Concrete used behind retaining walls shall be 1,000 psi at 28 days, with 8" slump and 1/2" maximum aggregate.

3. EXECUTION:

A. Concrete Design

- (1) Design mixes shall develop the compressive strength within 28 days as indicated on the drawings for the various uses indicated.
- (2) Concrete shall be of the specified quality capable of being placed without excessive segregation and, when hardened, of developing all characteristics required by Specifications.
- (3) The proportions of ingredients for concrete shall be selected in accordance with ACI 318, Sections 5.2, 5.3, and 5.4, to produce the proper placeability, durability, strength and other required properties. However, total water content, including free moisture in the aggregate and all liquid admixtures shall not exceed 40 gallons per cubic yard, or as specified in the General Structural Notes, whichever is more restrictive.
- (4) Limit slump as indicated on the drawings.
- (5) All concrete shall be mechanically mixed until uniformly distributed. Each batch shall be mixed at least one minute after all the materials are in the mixer, and the mixer must be completely discharged before recharging. No ready-mix concrete shall be used which has been in the truck more than 90 minutes (60 minutes if air temperature exceeds 85 degrees) from the batch plant. All ready-mix concrete shall be prepared in conformance with ASTM C94

B. Joints

- (1) Construction Joints in Structural Members: Location and detail of all construction joints in structural members, including structural slabs, piers, walls, grade beams, and footings shall be subject to the approval of the Engineer of Record.
- (2) Joints in Slabs on Grade: Install contraction, construction, and expansion joints as shown in slabs on grade.
  - a. Provide one layer 30 pound felt at all locations where interior slabs on grade abut a vertical surface, and 1/2 inch preformed joint filler where exterior slabs as shown in slabs on grade.
  - b. Control (contraction) joints in slabs shall be located as detailed on the plans.
  - c. Joints in exterior concrete walks, slabs, etc., shall be placed

as follows except as otherwise noted:

- 1) Expansion Joint - 15'-0" o.c. each way.
- 2) Cut Joints or Contraction Joints – per joint layout plan.

C. Placing Concrete

- (1) Inspection: All concrete excavations, trenches, forms, reinforcing miscellaneous steel and anchor bolt placement related items shall be inspected and approved by the Architect's representative prior to pouring any concrete. For this purpose the Architect shall be notified 24 hours in advance by the Contractor of his intention to pour concrete.
- (2) Concrete shall be placed in approximately horizontal layers not to exceed 12" in depth and the concrete pour shall be carried on in a continuous operation until the placing in the section or monolith is completed. Concrete shall be deposited at or near its final position to avoid segregation caused by rehandling or flowing. No concrete shall be dropped freely into place from a greater height than five feet. Tremies shall be used for placing concrete where the drop is in excess of such a height.
- (3) Concrete shall be placed with the aid of approved mechanical vibrating equipment. Vibration shall be transmitted directly to the concrete, sufficiently intense to cause the concrete to settle readily into place and to visibly affect the concrete over a radius of at least 18". Vibrators shall not, however, be used to transport concrete or force concrete to flow horizontally. Vibration shall be supplemented by manual forking or spading adjacent to the forms on exposed faces in order to secure smooth, dense surfaces. If, for any reason, the surfaces or interiors have voids or are in any way defective, such concrete shall be patched or repaired as directed by the Architect, and no defective work shall be patched or repaired without the prior inspection and approval of the Architect.
- (4) Concrete placing shall continue without avoidable interruption unless otherwise specified, until the predetermined limit of the placement has been attained.
- (5) Placing of concrete in which initial set has occurred or placing of retempered concrete will not be permitted. Concrete which has contained water for more than 90 minutes will not be accepted.
- (6) When placing fresh concrete against old concrete, the latter shall be cleaned of all objectionable matter, and a proper bond shall be made by grouting with neat cement or painting with "Weldcrete".

D. Hot Weather Requirements

- (1) Steps shall be taken as necessary to reduce concrete temperatures and water evaporation by proper attention to ingredients, production methods, handling, placing, and curing. During hot weather, concrete pours shall be scheduled for the early morning hours to maximum extent possible, to allow for placing, finishing and protection of the entire monolith poured by a time not later than 12:00 noon. Details of hot weather concrete pours shall be in accordance with ACI 305.
- (2) Contractor shall provide fog spraying during placement of slabs-on-grade, or other methods approved by the architect, when the rate of evaporation equals or exceeds 0.2 pounds per square foot per hour as specified on the drawings.

E. Cold Weather Requirements

- (1) Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
- (2) No concrete shall be placed if anticipated temperatures of the surrounding air are to go below 30 degrees F, unless provisions are made for a heated enclosure for protection. Removal of forms during cold weather concreting shall be based on strength tests of field cured cylinders as directed and approved by Architect.
- (3) When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat all water and aggregates before mixing as required to obtain a concrete mixture temperature of not less than 50 degrees F, and not more than 80 degrees F at point of placement.
- (4) Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- (5) Do not use calcium chloride, salt or other materials containing antifreeze agents or chemical accelerators.

F. Curing Concrete

- (1) Concrete shall be protected against loss of moisture, rapid drying or temperature changes, mechanical injury or injury from rain or flowing water for a period of at least seven days in accordance with requirements of ACI 308 and ACI 305, as specified herein. Curing shall commence as soon as free water has disappeared from the

surfaces after finishing.

- (2) Formed Surfaces: Forms in contact with concrete during the curing period shall be kept wet. If forms are removed during the curing period, a curing method and/or materials, approved by the Architect, shall be employed immediately. Such curing shall be continued for the remainder of the curing period.
- (3) Curing may be accomplished by any of the following methods:
  - a. Moist Curing: Surfaces shall be kept continuously set by covering with burlap, mats or sand, thoroughly saturated with water and covering kept wet by spraying or hosing. Place materials to provide complete surface coverage and lap all joints minimum 3".
  - b. Moisture-Retaining Cover Curing: Surfaces shall be thoroughly wetted with a fine spray of water and then covered with waterproof paper, polyethylene sheeting or polyethylene coated waterproof paper. Edges and ends of sheeting shall be overlapped not less than 4" and securely cemented or taped to form a continuous cover. Sheeting shall be weighted down to prevent displacement and shall be repaired or replaced if torn, damaged, or removed during curing period.
  - c. Liquid Membrane Forming Curing Compound: Compound shall not penetrate, stain, or have any deleterious effect on finish. Compound shall not be used on floors to receive dust preventative treatment or on slabs to receive additional concrete fill. Immediately following removal of forms, loose materials and debris shall be removed from surfaces, the surfaces thoroughly moistened with a light spray of water, and expansion joints and other joint openings covered to prevent compound from entering. Compound shall be applied on damp surfaces as soon as moisture film has disappeared. Power spraying equipment shall be used. Material shall be applied in a two-coat, continuous operation at a coverage of not more than 200 square feet per gallon for each coat. Second coat shall be applied in a direction at right angles to application direction of first coat. Compound shall provide a uniform, continuous, adherent film that shall not check, crack, or peel, and shall be free from pinholes or other imperfections. Surfaces subjected to heavy rainfall within 3 hours after compound has been applied or surfaces damaged by subsequent construction operations within curing period shall be resprayed at specified rate. Coated surfaces shall be kept free of foot and vehicular traffic and other sources of abrasion during curing period. After

compound is dry, all surfaces to be subjected to traffic shall be covered with waterproof Kraft Paper, lapped 9", and covered with sand.

G. Finishing After Removal of Forms

(1) Vertical Surfaces:

- a. Immediately after removal of forms and before the concrete is dry, all excess projections and loose materials shall be removed; honeycomb, aggregate pockets, voids over 1/2" diameter and holes left by form ties cut back or undercut to solid concrete shall be thoroughly wetted, brush-coated with grout consisting of equal parts of Portland cement to two parts fine aggregate. When dry, mortar shall match concrete in color. Holes extending entirely through the walls shall be filled from back, forcing the mortar through the wall. Patching shall be damp cured for period as specified under CURING. Exposed patchwork shall be finished to match texture of adjacent concrete surfaces. All new surfaces adjacent to existing surfaces shall match existing finishes.
- b. Smooth Finish: All exterior and interior exposed surfaces not otherwise noted shall be finished smooth. Mix 1 part Portland cement and 1-1/2 parts fine aggregate with water to produce a grout having the consistency of thick paint. White or light colored Portland cement shall be used to obtain the desire color. Wet surface to prevent absorption of water from grout. Apply grout uniformly, completely, filling air bubbles and holes. Immediately after applying grout, float the surface with cork or wood floats, scouring the wall vigorously. While grout is still plastic, surface shall be finished with a sponge rubber float, removing excess grout. The finishing shall be done at the time when grout will not be pulled from holes or depressions. After the surfaces have dried thoroughly, rub vigorously with dry burlap to completely remove dried grout. There shall be no visible film of grout remaining after rubbing. The entire finishing operation for any area shall be completed the day it is started. Grout shall not be left on the wall overnight. Finished surfaces shall be uniform in color and texture, without lap marks or clouding. Spots or streaks shall be retreated.

(2) Finishing Concrete Slabs:

- a. Surface of concrete fill and slabs shall be at elevation to receive finish specified and noted. Finished fill and slabs shall be struck off true and level surfaces with a tolerance of 1/8 inch in 10 feet as measured with a 10 foot straightedge

and the Floor flatness and Floor Levelness criteria specified on the drawings. Upon completion of leveling, all screeds shall be removed and spaces filled with concrete. Finished work shall permit the free drainage of water from surface at all points. Finishing may be by hand or power finishing machines. Joints and edges shall be straight and finished with jointing and edging tools.

- b. Float Finish for interior slabs shall be obtained by screeding to finish elevation and all surface water and laitance removed. Floating shall commence as soon as screeded surface has sufficiently set. Floating may be performed by hand using a wood float, or by power driven floats to produce a smooth, even textured surface. Slabs in all areas which are to receive ceramic or quarry tile shall be float finished.
- c. Monolithic Finish for interior slabs shall be obtained by striking off to true surface at finished elevation, then screeding and floating with straightedges to bring surface to finish level. While concrete is still green but sufficiently hardened to bear a man's weight without deep imprint, it shall be wood-floated to a true, even plane with no coarse aggregate visible. Sufficient pressure shall be used on floats to bring moisture to the surface. After surface moisture has disappeared, surfaces shall be steel-troweled to a smooth, even, impervious finish, free from trowel marks. When the concrete has sufficiently set to ring the trowel, the surface shall receive a second steel-troweling to a burnished finish except that surfaces receiving resilient flooring shall not receive the second steel troweling. All slab areas shall receive a monolithic finish except those specifically excluded under other finishes specified herein. Coordinate efforts where the concrete floor is the exposed surface to control finish and cracks.
- d. Broomed Finish for exterior sidewalks, slabs, platforms, stair treads and ramps shall be finished by tamping the concrete to force coarse aggregate away from the surface, screeding and floating to bring surface to finish level, steel troweling to an even, smooth surface and then brooming with a fine hair broom in a direction transverse to that of the principal traffic, or in the patterned direction as indicated on the drawings.
- e. Float Finish for exterior sidewalks shall be obtained by screeding to finish elevations and all surface water and laitance removed. Floating shall commence as soon as screeded surface has sufficiently set. Floating may be performed by hand using a wood float, or by power driven, floats to produce a smooth, even textured surface. All slab

edges, including those of formed joints, shall be finished carefully with an edger having a radius of 1/8 inch.

f. Chemical-Hardener Finish: In addition to finishing as specified for monolithic finish, apply chemical-hardener finish to interior concrete floors where shown on Drawings or on schedules as "exposed concrete".

1) Apply liquid chemical-hardener after complete curing and drying of the concrete surface. Dilute liquid hardener with water, and apply in three coats; first coat, 1/3 strength; second, 1/2 strength; third coat, 2/3 strength. Evenly apply each coat, and allow 24 hours for drying between coats. Apply proprietary chemical hardeners in accordance with manufacturer's printed instructions.

#### H. Cement Mortar or Grout

(1) Cement mortar for the repair of imperfect concrete work, the filling of holes left by form bolts and ties, and the filling of voids, around piping through concrete shall consist of cement and sand mixed in the same proportion as used for the concrete being repaired, with only sufficient water to give the required consistency, but in no case shall the water-cement ratio be more than that specified for Class "A" concrete. Bolt holes shall be filled with dry pack mortar, well tamped down into holes.

(2) Grout for spreading over the surfaces of construction joints shall consist of water and cement mixed in the ratio of not to exceed seven gallons per sack with sufficient sand added to produce the desired workability of the mass.

(3) Cement mortar or grout that has not been placed within 30 minutes after mixing shall be wasted.

#### I. Inserts

(1) Pipes, anchor bolts, sleeves, reglets, casings and other inserts, as shown on the plans, or as required, shall be encased in the concrete unless otherwise noted.

(2) Contractor shall notify all subcontractors and other prime contractors who have items to be embedded in or pass through the concrete at least five days in advance of the placing of concrete.

(3) The Contractor shall leave any openings through the walls or floors as shown on Mechanical and Electrical drawings and other required openings as directed by the Architect. In case of any conflict with

structural members, the Contractor shall notify the Architect and suitable solution resolved before the concrete is placed.

J. Cleaning

- (1) After the concrete work is complete, carefully remove all excess concrete and all protective materials and broom the surfaces and remove all mortar and other foreign materials. All concrete inserts, anchors bolts, etc., shall be cleaned of all concrete after forms are removed.

K. Waste Management

- (1) Separate and recycle waste materials to the maximum extent economically feasible.
- (2) Before concrete pours, designate locations or uses for excess concrete. Options include:
  - a. Additional paving
  - b. Post footing anchorage
  - c. Swale, riprap reinforcing
  - d. Flowable fill
  - e. Footing bottom, retaining wall footing ballast
  - f. Storm structure covers
  - g. Underground utility pipe kickers
  - h. Storm pipe flared end section
  - i. Toe wash protection, and shoulder and toe outfall restraints for temporary erosion pipes
- (3) Before concrete pours designate a location for cleaning out concrete trucks. Options include:
  - a. Company-owned site for that purpose (meeting environmental standards)
  - b. On-site area to be paved later in project.

END OF SECTION  
END OF DIVISION

**DIVISION 5 – METALS**

**054000 LIGHT GAUGE STRUCTURAL STEEL STUD SYSTEM**

1. GENERAL

A. Description of Work

- (1) Work as evident on the drawings and specified herein or required to furnish and install the load bearing metal stud system, complete.

B. Standards

- (1) Comply with the latest editions in effect of the following codes and standards, except as otherwise shown or specified:
  - a. IBC International Building Code, Chapter 22, Section 2210-2211
  - b. ICC Research Committee Recommendations
  - c. ASTM American Society for Testing and Materials Standards
  - d. AISI Specification for Design of Cold-Formed Steel Structural Members
  - e. AWS D1.3 Structural Welding Code.

C. Submittals

- (1) Manufacturer's Data: Submit 3 copies of manufacturer's specifications for products to be used.
- (2) Shop Drawings: Submit shop drawings in accordance with Section 013300 Shop Drawings and Samples showing all shop drawings for fabrication and erection of light gage steel structural framing. Include plans, elevations, details of sections and connections, shop anchorage and accessory items.
- (3) In reviewing shop drawings, the Architect / Engineer will attempt to detect omissions and majors errors, but neither failure of the Architect / Engineer to do this nor the review of the shop drawings shall relieve the Contractor of their responsibility to comply with the Drawings and Specifications. Approval of shop drawings in no way relieves the Contractor or fabricator of their responsibility for all errors of detailing, fabrication and erection, and for the correct fitting of structural members.
- (4) Certification: Certified copies of mill test reports, including names and locations of mills and shops, shall be furnished for all light gauge structural steel.

- (5) Weld Procedures Specifications: WPS in conformance with AWS requirements shall be submitted for each type of weld to be constructed.

D. Delivery, Storage and Handling

- (1) Deliver materials to the site at such intervals to insure uninterrupted progress of the work.
- (2) Store materials to permit easy access for inspection and identification. Keep steel members off the ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from erosion and deterioration. Repair or replace damaged materials as directed.

2. PRODUCTS

A. Light Gage Steel Structural Framing

- (1) Members include, but not necessarily limited to, studs, tracks, bridging connections and anchorages, and all accessory items required by the work.
- (2) These members and accessories shall be of the type, size, and gage as shown on drawings by design; and shall be cold-formed from steel meeting the following requirements:
  - a. Painted 12, 14, and 16 gage structural studs, joists, tracks and diagonal straps: ASTM A1008, Grade 50, with a minimum yield stress of 50,000 psi.
  - b. Painted 18 and 20 gage structural studs, joists and tracks; all painted bridging, end closures and accessories shall be formed from steel that corresponds to the requirements of ASTM A1003, Grade C with a minimum yield of 33,000 psi.
  - c. Galvanized 12, 14, and 16 gage structural studs, joists, tracks and diagonal straps: ASTM A653, Grade D, with a minimum yield stress of 50,000 psi.
  - d. Galvanized 18 and 20 gage structural studs, joists and tracks; bridging, end closures and accessories shall be formed from steel that corresponds to the requirements of ASTM A653, with a minimum yield of 33,000 psi.
  - e. The minimum structural properties for structural studs to comply with the requirements shown on the drawings.

- (3) All painted materials and accessories shall be primed with rust inhibitive paint.
- (4) Welding electrodes: AWS A5.1, E70XX for manual shielded metal-arc welding.

### 3. EXECUTION

#### A. Framing

- (1) Studs shall be seated squarely in upper and lower tracks with the stud web and flanges abutting the track web, and against structural steel members as shown on drawings. The studs shall be plumbed or aligned, and securely attached to the upper and lower tracks.

#### B. Connections

- (1) Connections and attachments of similar members and components shall be done by screw attaching as shown on Drawings. Dissimilar members and components shall be attached by welding, screw attaching, or bolting. Wire tying of members and components shall not be allowed.

#### C. Splices

- (1) Splices of runner track shall be made in accordance with details shown on the drawings.
- (2) Splices shall not be allowed in vertical structural framing members, except in accordance with details shown on Drawings.

#### D. Bridging

- (1) Provide two rows of bridging at approximately 1/3 height span apart, except where otherwise shown on Drawings.

#### E. Field Welding

- (1) Welding shall be done using manual shielded metal-arc process or a wire feed type welder approved by the Architect. The welding process and details shall conform to the requirements of the Structural Welding Code (AWS D1.3) of the American Welding Society and the approved weld procedures specifications.
- (2) Welds shall be made only by welders who have been qualified by tests and hold a current valid certificate, issued by an approved independent testing laboratory, to perform the type of welds required by the work. The qualifying tests shall be as prescribed in

the Structural Welding Code (AWS D1.3) of the American Welding Society (AWS). Copies of the welders or welding operators' certificates shall be furnished by this Contractor upon request of the Architect/Engineer.

- (3) All welds shall be fillet, butt, plug, or seam, and shall be sufficient to develop connections.
- (4) Prior to commencing welding, the welders shall demonstrate their ability to the Architect that they can satisfactorily produce the welds herein before specified and/or shown on Drawings. In order to demonstrate their ability the welders shall weld together samples of light gage steel structural framing members simulating each type of weld (fillet, butt, plug, or seam) that is required by the work.
- (5) The subcontractor shall comply with all demands of the Architect/Engineer (welding inspector) to correct improper workmanship and to remove and replace, or correct as instructed, all welds which do not comply with drawings and specifications. In the event that faulty welding, or its removal for rewelding, shall so damage the base metal that its retention is not in accordance with the intent of the drawings and specifications, this subcontractor shall remove and replace the damaged materials or shall compensate for the deficiency in a manner approved by the welding inspector.

F. Field Painting

- (1) Shop painted light gage steel structural framing furnished by the subcontractor, when marred by the work of other trades or welding, bolting, or erection, shall be touch-up painted in a manner approved by the Architect.

END OF SECTION

## **055000 METAL FABRICATIONS**

### **1. GENERAL**

#### **A. Summary**

- (1) This Section includes the following:
  - a. Loose bearing and leveling plates
  - b. Loose steel lintels
  - c. Shelf angles
  - d. Miscellaneous steel framing and supports
  - e. Miscellaneous steel trim
  - f. Pipe guards
  - g. Pipe bollards

#### **B. Submittals**

- (1) Shop Drawings: Furnish shop drawings in accordance with Section 013300 Shop Drawings and Samples showing all plans, elevations, sections, details of installation, and attachments to other Work. Shop drawings shall be approved before fabrication.
- (2) In reviewing shop drawings, the Architect / Engineer will attempt to detect omissions and major errors, but neither failure of the Architect / Engineer to do this nor the review of the shop drawings shall relieve the Contractor of their responsibility to comply with the Drawings and Specifications. Approval of shop drawings in no way relieves the Contractor or fabricator of their responsibility for all errors of detailing, fabrication and erection, and for the correct fitting of structural members.
- (3) Templates: For anchor bolts.
- (4) Samples: For each type and finish of extruded nosing and tread.

### **2. PRODUCTS**

#### **A. Metals**

- (1) Metal Surfaces, General: Provide materials with smooth, flat surfaces without blemishes.

#### **B. Ferrous Metals:**

- (1) Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

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- (2) Steel Tubing: Cold-formed steel tubing complying with ASTM A500.
- (3) Steel Pipe: ASTM A 53, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.
- (4) Slotted Channel Framing: Cold-formed metal channels 1-5/8 by 1-5/8 inches with flange edges returned toward web and with 9/16-inch-wide slotted holes in webs at 2 inches o.c. Channels made from galvanized steel complying with ASTM A 653/A 653M, structural quality, Grade 33 with G90 coating; 0.079-inch nominal thickness.
- (5) Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A153/A 153M.

C. Aluminum:

- (1) Extrusions: ASTM B 221, alloy 6063-T6.
- (2) Alloy Rolled Tread Plate: ASTM B 632/B 632M, alloy 6061-T6.

D. Paint

- (1) Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664 and compatible with finish paint systems indicated.
  - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - i. Carboline Company; Carboline 621.
    - ii. PPG Industries, Inc.; Aquapon Zinc-Rich Primer 97-670.
    - iii. Tnemec Company, Inc.; Tneme-Zinc 90-97.
- (2) Galvanizing Repair Paint: SSPC-Paint 20, high-zinc-dust-content paint for re-galvanizing welds in steel.

E. Miscellaneous Materials

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- (1) Fasteners: Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls, of type, grade, and class required by application indicated.
- (2) Nonshrink, Nonmetallic Grout: ASTM C 1107, factory-packaged, nonstaining, noncorrosive, nongaseous grout.

F. Fabrication

- (1) Connections, General: Use connections that maintain structural value of joined pieces.
  - a. Shear and punch metals cleanly and accurately. Remove burrs.
  - b. Weld corners and seams continuously. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove welding flux immediately. Finish exposed welds smooth and blended.
  - c. Fabricate joints that will be exposed to weather in a manner to exclude water, or provide weep holes.
  - d. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Locate joints where least conspicuous.
- (2) Loose Bearing and Leveling Plates: Fabricate loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- (3) Loose Steel Lintels: Fabricate loose structural-steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated.
- (4) Miscellaneous Framing and Supports: Fabricate steel framing and supports that are not a part of structural-steel framework as necessary to complete the Work from structural steel of welded construction. Cut, drill, and tap units to receive hardware, hangers, and similar items.
  - a. Where indicated to be cast into concrete or built into masonry, equip with integrally welded anchors at 24 in. o.c.
  - b. Fabricate steel pipe columns for supporting wood frame construction with steel baseplates and top plates welded to pipe with fillet welds the same size as pipe wall thickness.

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- (5) Miscellaneous Steel Trim: Fabricate units with continuously welded joints and smooth exposed edges. Miter corners and use concealed splices where possible. Fabricate cutouts, fittings, and anchorages; coordinate assembly and installation with other work.
- (6) Pipe Guards: 1-1/2" x 1-1/2" x 1/4" steel pipe, extending from floor to 42 inches above floor, with 3/8-inch steel baseplates for bolting to floor or structure. Connect tops of pipes with 1-1/2" x 1-1/2" x 1/4" steel pipe and anchor to wall or column with 1/4" x 2" steel strap braces welded to pipes and bolted to wall.
- (7) Pipe Bollards: Fabricate from Schedule 40 steel pipe.

G. Finishes

- (1) Finish metal fabrications after assembly. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Shop prime ferrous-metal items not indicated to be galvanized.
- (2) Hot-dip galvanize items indicated to be galvanized to comply with ASTM A123 or ASTM A153/A 153M as applicable.
- (3) Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with SSPC-SP 3, "Power Tool Cleaning."
- (4) Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1," for shop painting.

3. EXECUTION

A. Installation

- (1) General: Provide anchorage devices and fasteners for securing metal fabrications to in-place construction. Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, with edges and surfaces level, plumb, and true.
  - a. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
  - b. Fit exposed connections accurately together. Weld connections, unless otherwise indicated. Do not weld, cut, or abrade galvanized surfaces.

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- (2) Set bearing and leveling plates on cleaned surfaces using wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts and pack with nonshrink, nonmetallic grout.
- (3) Bollards:
  - a. Anchor in place with concrete footings. Support and brace bollards in position in footing excavations until concrete has been placed and cured.
  - b. Fill bollards solidly with concrete, mounding top surface.
- (4) Touch up surfaces and finishes after erection.
  - a. Painted Surfaces: Clean field welds, bolted connections, and abraded areas and touch up paint with the same material as used for shop painting.
  - b. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION  
END OF DIVISION

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**DIVISION 6 – WOOD AND PLASTICS**

**061000 ROUGH CARPENTRY**

1. SCOPE:

- A. Furnish all labor, materials, and equipment necessary to complete all carpentry work as shown on the drawings and/or specified herein. The quality and design of wood members and their fastenings used for load-bearing purposes shall conform to the provisions of Chapter 23 - Wood, of the International Building Code.
- B. Submittals
  - (1) Submit product data on wood preservative materials, including application instructions.

2. PRODUCTS:

- A. Lumber shall be sound, well manufactured, S4S or rough sawn where noted on drawings, free from warp with a moisture content not exceeding 19% graded according to West Coast Lumber Association Inspection Bureau.
- B. All framing lumber: Douglas Fir-Larch, of Grade as indicated on the drawings.
- C. Cant strips: Plywood or fiber cants.
- D. Joist Hangers and Connectors: Simpson Strong-Tie, or equal.
- E. Builders Hardware as required to properly do all carpentry work. Use non-corrosive bolts, nails, and metal fittings for exposed connections.
- F. Adhesives for Field Gluing Panels to Framing: Formulation complying with ASTM D 3498 that is approved for use with type of construction panel indicated by both adhesive and panel manufacturers. The VOC content shall not be more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- G. All wood sill plates resting on concrete slabs on grade, concrete curbs, or masonry stem walls shall be wolmanized by pressure treating or foundation grade redwood.
- H. Roof Sheathing: Plywood or Oriented Strand Board (OSB) as indicated on the drawings.

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- I. Fire-Treated Plywood (if applicable): 5/8" fire-treated plywood at roof as noted and in communications closets as noted in room finish schedule. Mount with smooth side out. 1/2" fire-treated plywood to support exterior wall mounted light fixtures on metal panel wall locations. Laminate as required to achieve necessary thickness behind panels.
  - J. Laminated Veneer Lumber (LVL) per General Structural Notes.
3. WORKMANSHIP:
- A. Protect framing and sheathing from moisture during delivery, installation, and use. Allow framing to dry before enclosing in any system – wall, roof, etc.
  - B. Provide for passage of pipes, ducts, etc., without cutting structural members.
  - C. Size and set framing to give true surfaces for finish.
  - D. Accurately locate and secure 2" backing for plumbing fixtures. Use cut-off ends for backing whenever possible to reduce waste.
  - E. Provide solid blocking at all unsupported edges of each sheet of roof deck sheathing.
  - F. Sheathing to be laid as per manufacturer's recommendations and nailed at all bearing points and ends. See nailing schedule on drawings.
  - G. Nailing: All exposed nails to be corrosion resistant. Minimum 2 nails per contact. 10d for 1" material and 16d for 2" material. Conform to IBC Chapter 23. Holes bored where necessary to prevent splitting. All plywood nailing per drawings.
  - H. Painting: Do not paint fire-treated plywood.

END OF SECTION

## **061600 SHEATHING**

### **PART 1 GENERAL**

#### **1.01 SUMMARY**

- A. Section Includes: Fiberglass-mat faced, moisture and mold resistant gypsum sheathing.
- B. Related Sections:
  - 1. Section 054000: Light Gauge Structural Steel Stud System
  - 2. Section 061000: Rough Carpentry
  - 3. Section 092900: Gypsum Board

#### **1.02 REFERENCES**

- A. ASTM International (ASTM):
  - 1. ASTM C473 Standard Test Methods for Physical Testing of Gypsum Panel Products.
  - 2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
  - 3. ASTM C1002 Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - 4. ASTM C1177 Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - 5. ASTM C1280 Standard Specification for Application of Gypsum Sheathing.
  - 6. ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
  - 7. ASTM D6329 Standard Guide for Developing Methodology for Evaluating the Ability of Indoor Materials to Support Microbial Growth Using Static Environmental Chambers.
  - 8. ASTM E72 Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
  - 9. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.
  - 10. ASTM C1396 Standard Specification for Gypsum Board.
  - 11. ASTM E 136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
  - 12. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

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- B. Gypsum Association (GA): GA-253 Application of Gypsum Sheathing.

1.03 SUBMITTALS

- A. Product Data: Manufacturer's specifications and installation instructions for each product specified.

1.04 WARRANTY

- A. Provide products that offer twelve months of coverage against in-place exposure damage (delamination, deterioration and decay) commencing with the date of installation of the product in such structure.
- B. Manufacturer's Warranty:
  - 1. Five years against manufacturing defects.
  - 2. Twelve (12) years against manufacturing defects when used as a substrate in architecturally specified EIFS.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Georgia-Pacific Gypsum LLC:
  - 1. Fiberglass-Mat Faced Gypsum Sheathing: DensGlass Sheathing.
  - 2. Fiberglass-Mat Faced Gypsum Sheathing, Type X for Fire Rated Designs: DensGlass Fireguard Sheathing.
- B. Prior Approved Equal

2.02 MATERIALS

- A. Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177:
  - 1. Thickness: 1/2 inch.
  - 2. Width: 4 feet.
  - 3. Length: 8 feet, 9 feet, or 10 feet as required.
  - 4. Weight: 1.9 lb/sq. ft.
  - 5. Edges: Square.
  - 6. Surfacing: Fiberglass mat on face, back, and long edges.
  - 7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 540 pounds per square foot, dry.

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8. Flexural Strength, Parallel (ASTM C473): 80 lbf, parallel.
  9. Humidified Deflection (ASTM C1177): Not more than 2/8 inch.
  10. Permeance (ASTM E96): Not less than 23 perms.
  11. R-Value (ASTM C518): 0.56.
  12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
  14. Acceptable Products:
    - a. 5/8 inch DensGlass Sheathing, Georgia-Pacific Gypsum.
    - b. Prior approved equal.
- B. Fire-Rated Fiberglass-Mat Faced Gypsum Sheathing: ASTM C1177, Type X:
1. Thickness: 5/8 inch.
  2. Width: 4 feet.
  3. Length: 8 feet, 9 feet, or 10 feet as required.
  4. Weight: 2.5 lb/sq. ft.
  5. Edges: Square.
  6. Surfacing: Fiberglass mat on face, back, and long edges.
  7. Racking Strength (Ultimate, not design value) (ASTM E72): Not less than 654 pounds per square foot, dry.
  8. Flexural Strength, Parallel (ASTM C1177): 100 lbf, parallel.
  9. Humidified Deflection (ASTM C1177): Not more than 1/8 inch.
  10. Permeance (ASTM E96): Not less than 17 perms.
  11. R-Value (ASTM C518): 0.67.
  12. Mold Resistance (ASTM D3273): 10, in a test as manufactured.
  13. Microbial Resistance (ASTM D6329, UL Environmental GREENGUARD 3-week protocol): Will not support microbial growth.
  14. Acceptable Products:
    - a. 5/8 inch DensGlass Fireguard Sheathing, Georgia-Pacific Gypsum.
    - b. Prior approved equal.

## 2.03 ACCESSORIES

- A. Screws: ASTM C1002, corrosion resistant treated.

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PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions:

1. Inspection: Verify that project conditions and substrates are acceptable, to the installer, to begin installation of work of this section.

3.02 INSTALLATION

A. General: In accordance with GA-253, ASTM C1280 and the manufacturer's recommendations.

1. Manufacturer's Recommendations:

- a. Current "Product Catalog", Georgia-Pacific Gypsum.
- b. Recommendations from Prior Approved Equal.

3.03 PROTECTION

A. Protect gypsum board installations from damage and deterioration until date of Substantial Completion.

END OF SECTION  
END OF DIVISION

**DIVISION 7 – THERMAL AND MOISTURE PROTECTION**

**072100 THERMAL INSULATION**

1. GENERAL:
  - A. SCOPE: Furnish and install insulation as indicated on drawings and specifications.
  - B. Work Not Included: Duct and pipe insulation, rigid type roof insulation.
2. MATERIALS:
  - A. Foam-Plastic Board Insulation
    - (1) Extruded-Polystyrene Board Insulation: ASTM C578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
    - (2) Manufacturers: subject to compliance with requirements, provide products by one of the following:
      - a. DiversiFoam Products
      - b. Dow Chemical Company
      - c. Owens Corning
      - d. Pactive Building Products
    - (3) Basis of Design: Owens Corning Foamular 250 (XPS), R-5 / inch.
    - (4) Utilized behind EIFS and metal panels.
  - B. Thermal & Sound Batt Insulation
    - (1) Unfaced glass fiber thermal insulation complying with ASTM C665, Type I and ASTM E 136.
    - (2) Above ceilings and concealed locations: Reinforced-foil-faced glass fiber thermal insulation complying with ASTM C 665, Type III (reflective faced), Class A (faced surface with a flame-spread index of 25 or less); Category I (membrane is a vapor barrier), faced with foil scrim, foil-scrim kraft, or foil-scrim polyethylene.
    - (3) Exposed all other areas: Polypropylene fiberglass / polypropylene blend fabric facing, GYMGUARD by LAMTEC Corp. or approved equal, complying with ASTM E 84.

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- a. White Film: Metalized polypropylene, .0015 inch.
- b. Fabric: Fiberglass / polyester blend, 75 lbs. / 3000 S.F.
- c. Vapor Retarder Perm Rating: .02 Maximum when tested in accordance with ASTM E 96.
- d. Surface Burning Characteristics:
  - 1) Maximum flame spread: 5
  - 2) Maximum smoke developed: 40
- e. Bursting Strength: 250 psi per ASTM D 774.
- f. Puncture Resistance: 650 Beach units per ASTM C 1136.
- g. Tensile Strength: 195 lbs. / inch width per ASTM 1136.

B. Roof Insulation:

- (1) R-Value 38 when tested in accordance with ASTM C 518. Thickness 12".

C. Wall Insulation:

- (1) R-Value 19 when tested in accordance with ASTM C 518. Thickness 6". R-13 at furring.

D. Sound Batt Insulation

- (1) Unfaced glass fiber insulation complying with ASTM C 665, Type I and ASTM E 136.
    - a. R-Value 11 when tested in accordance with ASTM C 518.
    - b. Surface Burning Characteristics:
      - 1) Unfaced Insulation
      - 2) Maximum flame spread: 10
      - 3) Maximum smoke developed: 10
- When tested in accordance with ASTM E 84

3. EXECUTION:

- A. Foam-Plastic Board Insulation: seal joints between units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

- B. Blankets shall completely cover enclosed building space between exterior walls and roof and shall fit snugly together to form a uniform continuous,

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leak free, efficient insulative barrier. Care shall be taken to properly cover protrusions and penetrations.

- C. All installations shall be in accordance with the latest edition of the IBC.
- D. Comply with manufacturer's instructions for particular conditions of installation in each case.
- E. Under Roof Decks
  - (1) Apply insulation directly to the interior surface of the underside of roof deck with appropriate anchors per the manufacturer's recommendations.
- F. Between Studs:
  - (1) Friction-fit insulation between studs after cover material has been installed on one side of the cavity. Use wire or metal straps to hold insulation in place in applications without a cover material or where the stud depth is larger than the insulation thickness. When faced insulation is used, the attachment flanges may be taped to the face of the metal stud prior to applying the interior finish.
  - (2) Provide supplementary support to hold the product in place until finish surface is applied when insulation is installed in heights over 8 feet.
- G. Sound Attenuation Blankets: Install 3" batts in toilet and mechanical room walls and sound rated partitions indicated on drawings. Blankets shall be friction fit and completely fill spaces.
- H. Separate and recycle waste materials to the greatest extent possible.

END OF SECTION

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**072610 UNDER-SLAB VAPOR BARRIER**

1. GENERAL

A. Summary

- (1) Products supplied under this section:
  - a. Vapor barrier, seam tape, and mastic for installation under concrete slabs.
- (2) Related sections:
  - a. Section 033000, Cast-in-Place Concrete.

B. References

- (1) American Society for Testing and Materials (ASTM):
  - a. ASTM E 1745-09 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
  - b. ASTM E 154-99 (2005) Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
  - c. ASTM E 96-05 Standard Test Methods for Water Vapor Transmission of Materials.
  - d. ASTM F 1249-06 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.
  - e. ASTM E 1643-09 Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
- (2) American Concrete Institute (ACI):
  - a. ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials.

C. Submittals

- (1) Quality control/assurance:
  - a. Summary of test results as per paragraph 8.3 of ASTM E 1745.
  - b. Manufacturer's samples, literature.

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- c. Manufacturer's installation instructions for placement, seaming and penetration repair instructions.

2. PRODUCTS

A. Materials

- (1) Vapor barrier must have all of the following qualities:
  - a. Permeance of less than 0.01 Perms [grains/(ft<sup>2</sup> · hr · inHg)] as tested in accordance with ASTM E 1745 Section 7.
  - b. Other performance criteria:
    - i. Strength: ASTM E 1745 Class A.
- (2) Vapor barrier products:
  - a. Basis of Design: Stego Wrap Vapor Barrier (15-mil) by Stego Industries LLC, (877) 464-7834 [www.stegoindustries.com](http://www.stegoindustries.com).

B. Accessories

- (1) Seam tape:
  - a. Stego Tape by Stego Industries LLC, (877) 464-7834 [www.stegoindustries.com](http://www.stegoindustries.com).
- (2) Vapor-proofing mastic:
  - a. Stego Mastic by Stego Industries LLC, (877) 464-7834 [www.stegoindustries.com](http://www.stegoindustries.com).

3. EXECUTION

A. Preparation

- (1) Ensure that base material is approved by Architect or Geotechnical Engineer.
  - a. Level and compact base material.

B. Installation

- (1) Install vapor barrier in accordance with manufacturer's instructions and ASTM E 1643.
  - a. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement.

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- b. Lap vapor barrier over footings and/or seal to foundation walls.
  - c. Overlap joints 6 inches and seal with manufacturer's tape.
  - d. Seal all penetrations (including pipes) per manufacturer's instructions.
  - e. No penetration of the vapor barrier is allowed except for reinforcing steel and permanent utilities.
- (2) Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

END OF SECTION

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## **079200 JOINT SEALANTS**

### **1. SCOPE:**

A. Sealant shall be installed at all intersections of dissimilar materials and elsewhere to provide an entirely weather-tight building. Color as selected by Architect to blend with surrounding surfaces.

### **B. Related Sections:**

- (1) Section 033000: Cast-in-Place Concrete
- (2) Section 042000: Unit Masonry
- (3) Section 064116: Plastic Laminate Faced Architectural Cabinets
- (4) Section 081113: Metal Doors and Frames
- (5) Section 084113: Aluminum Entrance and Window Frames
- (6) Section 092900: Gypsum Wallboard
- (7) Section 099000: Painting

### **C. Submittals:**

- (1) Product data for interior sealants including printed statement of VOC content.

### **2. MATERIALS:**

A. General: VOC of interior sealants and sealant primers must comply with the following limits when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

- (1) Sealants: Not more than 250 g/L
- (2) Sealant Primers for Nonporous Substrates: Not more than 20 g/L
- (3) Sealant Primers for Porous Substrates: Not more than 775 g/L

### **B. Sealants Type A - Silicone**

- (1) GE - Silpruf 2000
- (2) Dow Corning - 795
- (3) Tremco - Spectrem 2

### **C. Sealants Type B – Silicone-Urethane Hybrid (paintable)**

- (1) Sika – Sika Hi-flex 150 LM

### **D. Sealants Type C - Siliconized Acrylic**

- (1) GE

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- (2) Tremco
  - E. Sealants Type D - Tapes
    - (1) Norseal V-740 closed cell PVC
    - (2) Emseal
    - (3) Sonneborn
  - F. Sealants Type E - Mildew Resistant Silicone
    - (1) Dow Corning - 786
    - (2) Tremco
  - G. Polyethylene Foam Backer Rod.
3. INSTALLATION:
- A. Install all sealants in strict accordance with manufacturer's requirements.
  - B. Sealant selected shall be appropriate for materials adjoining joint and for anticipated movement.
    - (1) Type A: Storefront weather seals, storefront perimeter seals, joints with up to 50% anticipated movement.
    - (2) Type B: Masonry control joints, masonry perimeter joints, concrete joints, joints with up to 25% anticipated movement.
    - (3) Type C: Interior door frame perimeter, intersections between millwork and walls, surfaces requiring painting, joints with up to 7.5% anticipated movement.
    - (4) Type D: Joints between concrete and aluminum shapes and joints between irregular surfaces and machined surfaces.
    - (5) Type E: Provide mildew resistant caulking at all damp areas.
  - C. Drive compound into joint grooves with enough pressure to force out all air and solidly fill joint. Deep voids shall be filled with backer rod so that the tooled thickness of the caulk is approximately  $\frac{1}{2}$  the width of the joint.
  - D. Exposed sealant shall be free from wrinkles and uniformly smooth. Caulking around openings shall mean entire perimeter.
  - E. Adjoining surfaces shall be cleaned of any smears of compound.

END OF SECTION  
END OF DIVISION

**DIVISION 8 - DOORS AND WINDOWS**

**081113 METAL DOORS AND FRAMES**

1. GENERAL:

A. Scope:

- (1) Provide all labor and material for a complete installation at locations shown on the drawings and/or as described in the door schedule.

B. Related Sections:

C. Submittals

- (1) Shop drawings: Submit shop drawings for approval prior to fabrication.
- (2) Both doors and frames shall be provided by the same manufacturer.

2. MATERIALS:

A. Hollow Metal Doors & Frames shall be made per NAAMM Standard HMMA 862 (with the modifications listed below) as manufactured by Southwestern Door, Commercial Door and Hardware, or any door company that is a member of the Hollow Metal Manufacturers Association.

B. Doors:

- (1) Face Sheets; Interior and Exterior Doors: 14 gage.
- (2) Minimum thickness: 1 3/4"
- (3) Stiffeners: 18 gage, 6" spacing, spot-welded to both face sheets 5" O.C. (Alternate #5 - Doors shall be reinforced, stiffened and sound deadened with polystyrene slab core, 1.5 pound per cubic foot density, completely filling the inside of the door and laminated to the inside faces of panels.)
- (4) Vertical Edge: Continuous weld.
- (5) Top and bottom edges: Closed with 14 gauge continuous steel channel. Flush, top and bottom, not recessed.

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- (6) Glass Molding and Stops: Fixed moldings welded to door on security side, all stops 16 gage. All screws shall be countersunk.

C. Frames:

- (1) Interior and Exterior: 14 gauge.
- (2) Construction: Welded units with integral stop and trim.
- (3) Floor Anchors: 14 gauge weld inside jambs.
- (4) Jamb anchors: In masonry 14 gauge steel. For stud partitions 16 gauge steel anchors.

D. Hardware reinforcement:

- (1) Door hinges: 3/16" plate.
- (2) Lockface, flush bolts and closures L12 gauge steel.
- (3) Frame hinge: 3/16" plate.

3. INSTALLATION:

- A. Install in accordance with manufacturer's recommendations. Field verify all conditions. Anchor frames with four anchors each side.
- B. Grout frames solid in masonry walls.
- C. Pack frames solid with monocote in framed walls.

END OF SECTION

**083113 ACCESS DOOR**

1. GENERAL:
  - A. Scope: Furnish and install access doors at locations shown on the drawings, or as required by code for mechanical, electrical or plumbing access.
2. MATERIALS:
  - A. Manufacturers: Access doors shall be manufactured by Williams Brothers, J.L. Industries or equal.
  - B. Ceiling access doors below the roof hatch shall be 30"x 36". Others shall be sized as required.
3. INSTALLATION:
  - A. Install in strict accordance with manufacturer's recommendations.

END OF SECTION

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## **087100 DOOR HARDWARE**

### **PART 1 GENERAL:**

#### **A. Scope:**

- (1) Section Includes: Furnish and install Door Hardware as shown on Drawings and as specified herein, unless specifically excluded and specified in other Sections.

#### **B. Definitions:**

- (1) Door Hardware includes items known commercially as builders hardware which are required for swing, sliding and folding doors, gates and miscellaneous items as indicated, except special types of unique and non-matching hardware specified in the same Section as the door and door frame. Types of items in this Section include, but are not necessarily limited to, the following:

#### **C. System Description:**

- (1) General Requirements: While the Hardware Schedule is intended to cover doors and other movable parts of the building and establish a type and standard of quality, examine drawings and specifications and furnish proper hardware for openings whether listed or not. Hardware must meet applicable handicapped access standards, ordinances and codes. Omissions or corrections in hardware groups shall be brought to the attention of the Architect prior to bid opening. No extras will be allowed for omissions, changes or corrections necessary to facilitate proper installation.
- (2) If an item is not specified but will be required in a similar situation, furnish equal hardware to that specified for similar locations if practicable. If no similar location is specified, then use hardware in keeping with that specified.
- (3) The Work of this Section shall be the total responsibility of one firm herein identified as the Supplier/Installer. If the Supplier and Installer are not one firm then the Supplier shall be the responsible party and shall cover the complete coordination of related work in other Sections.

#### **D. Submittals:**

- (1) General: Submittals requirements are specified in Section 01300

Shop Drawings and Samples.

- (2) **Materials List:** As soon as practical after award of contract, submit a complete listing of materials to be furnished. Submit in quantities as directed by the Architect, showing each item proposed for installation use and quantities to be furnished. Supplier/installer bidders shall state in their bid the delivery date to Contractor.
- (3) **Product Data:** Submit manufacturer's technical information for each item of hardware. Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and maintenance of operating parts and finish.
- (4) **Hardware Schedule:** Submit final hardware schedule in manner indicated below. Hardware schedules are intended for coordination of work. Hardware schedule shall include a summary of individual items of hardware and related material used on the project, complete with the name of the manufacturer of each item. The Hardware Schedule shall be prepared in vertical format.
  - a. **Final Hardware Schedule Content:** Based on builders hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:
    - 1) Catalog number, type, style, function, size and finish of each hardware item.
    - 2) Name and manufacturer of each item.
    - 3) Fastenings and other pertinent information.
    - 4) Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
    - 5) Explanation of abbreviations, symbols, codes, etc. contained in schedule.
    - 6) Mounting locations for hardware.
    - 7) Door and frame sizes and materials.
    - 8) Keying information.
    - 9) Formatted in DHI vertical format.
  - b. **Submittal Sequence:** Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by builders hardware, and other

information essential to the coordinated review of hardware schedule.

- (5) Samples: When requested by the Architect, prior to submittal of the final hardware schedule and prior to final ordering of hardware, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule. Samples will be returned to the supplier/installer. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.
- (6) Templates: Supply templates to door and frame manufacturers, as required, to enable proper and accurate sizing and locations of cut-outs for hardware and door reinforcement. Delivery of templates shall be timely to prevent delays in construction.
  - a. Shipment of hardware prepaid to manufacturers requesting that hardware be incorporated in their work.
  - b. Where cylindrical locks are used in hollow metal doors, furnish lock information to the door manufacturer for reinforcing in the door at the time of manufacture.

E. Quality Assurance:

- (1) Qualifications:
  - a. Manufacturer: Obtain each kind of hardware (latch and lock sets, hinges, closers, etc.) from only one manufacturer, although several may be indicated as offering products complying with requirements. Manufacturer shall have five years experience in manufacture of comparable hardware.
  - b. The hardware consultant shall be, on a full-time basis, a regular member of the Door and Hardware Institute (DHI) and a registered Architectural Hardware Consultant (AHC) to properly detail work, order and supervise installation.
  - c. The supplier/installer shall be a recognized architectural finish hardware supplier/installer who has been furnishing hardware within a 300 mile radius of the project for a period of not less than five years, and who is, or employs an experienced hardware consultant who shall be available to the Owner, Architect and Contractor at reasonable times during the course

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of the work for consultation about the project's hardware requirements. The supplier/installer shall also be a factory authorized distributor for the items specified.

(2) Regulatory Requirements:

- a. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and national or local building code requirements. Provide only hardware which has been tested and listed by UL or FM for types and sizes of doors required and complies with requirements of door and door frame labels.
- b. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors UL or FM labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or FM label on exit devices indicating "Fire Exit Hardware".
- c. Comply with other applicable fire, handicapped and building codes, guidelines and regulations. Hardware supplied and installed shall meet the requirements of Arizona Revised Statutes, Title 34 Handicapped Requirements.

(3) Certifications: At the completion of installation, certify that material is properly installed, according to manufacturer's printed instructions. Submit certification in duplicate to the Architect after installation of hardware in accordance with Section 01700 Project Close-out.

F. Delivery, Storage and Handling:

- (1) Packaging of hardware is the responsibility of the supplier/installer. As material is received by the hardware supplier/installer from the various manufacturers, sort hardware as necessary. Deliver hardware in original and individual containers, complete with necessary fastenings, keys, instructions and templates for spotting mortising tools. Items particular to a specific door shall be clearly marked by door number and heading number on the package.
- (2) The hardware supplier/installer shall inventory hardware and verify that the count is correct. Each carton of hardware shall be marked with item numbers, corresponding to the item numbers on the Finish Hardware Schedule.
- (3) Provide secure lock-up for hardware delivered to the project, but not yet installed. Control and handling and installation of

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hardware items which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation. Store materials off the ground in dry, protected areas.

- (4) The Contractor shall tag and index keys, manuals, schematics, operating instructions and factory diagrams for release and use by the Owner.
- (5) Containers holding keyed locks and cylinders shall be marked with the following:
  - a. Heading Number
  - b. Door Number
  - c. Hand of Door (when required)
  - d. Key Symbol

G. Maintenance:

- (1) Provide Owner with manufacturer's parts list and maintenance instructions for each type of hardware supplied, including necessary wrenches and tools required for proper maintenance and adjustment of hardware, as supplied with hardware when shipped to General Contractor. The General Contractor shall gather parts lists, tools, etc. as supplied with the hardware at the time of installation and hold these items until close-out.
- (2) Tools for Maintenance: Furnish a complete set of specialized tools as needed for Owner's continued adjustment, maintenance, and removal and replacement of builders hardware.
- (3) Maintenance Service: Approximately six months after the acceptance of hardware in each area, the Hardware Installer, accompanied by the representative of the latch and lock manufacturer, shall return to the project and re-adjust every item of hardware to restore proper function of doors and hardware. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.
- (4) Replace hardware items which have deteriorated or failed due to faulty design, materials or installation of hardware units. Prepare a written report of current and predictable problems (of substantial nature) in the performance of the hardware. The supplier /installer shall not be responsible for adjustments, corrections or replacements due to abuse, vandalism or lack of required maintenance by the Owner on the hardware.

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H. Warranty

- (1) Warranty hardware against defects in materials and workmanship. Repair, replace or otherwise correct deficient materials at no additional cost to Owner.
  - a. Locksets: Ten-year warranty.
  - b. Closers: Thirty-year warranty.
  - c. Exit Device Three-year warranty
  - d. Electronic Hardware One year warranty

PART 2 PRODUCTS:

A. Manufacturers:

- (1) Acceptable Manufacturers:
  - a. Butt Hinges: Ives, Mc Kinney, Stanley.
  - b. Geared Hinges: Ives, Roton, Pemko.
  - c. Locksets: Schlage.
  - d. Cylinders/Cores: Schlage.
  - e. Exit Devices: Von Duprin, Ives VR pulls
  - f. Closers: LCN.
  - g. Over Head Stop/holders: Rixson, Glynn Johnson.
  - h. Threshold, Door bottom, Seals: National Guard, Pemko, Reese.
  - i. Stops, Kickplates: Ives, Trimco, Rockwood.
  - j. Pull, Push Plates, Misc.: Ives, Trimco, Rockwood.
  - k. Key Cabinet: Lund, Telkee.

B. Hardware:

- (1) Scheduled Hardware: Requirements for design, grade, function, finish, size and other distinctive qualities of each type of builders hardware is indicated in the Builder's Hardware Data Sheet and Hardware Schedule at the end of this Section. The drawings show the direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown. Products are identified by using hardware designation numbers of the following:
- (2) Manufacturer's product designations: One or more manufacturers are listed for each hardware type required. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply

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with requirements including those specified elsewhere in this section.

- (3) Fasteners: Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.
  - a. Furnish necessary screws, bolts or other fastenings of suitable size and type to anchor the hardware in position for heavy use and long life, and of compatible material and finish. Furnish fastenings with anchors according to the material to which it is applied, and as recommended by the manufacturer. Fasten closers on wood or mineral core doors with hex nuts and bolts.
  - b. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match the hardware finish or, if exposed in surfaces of other work, to match the finish of such other work as closely as possible, including "prepared for paint" in surfaces to receive painted finish.
  - c. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard units of the type specified are available with concealed fasteners.
- (4) Finish: Hardware shall be BHMA-626 (US26D) unless noted otherwise.

C. Hardware Types:

- (1) Hinges
  - a. Geared Hinges: Type as listed in hardware sets.
  - b. Shall conform to the applicable requirements of Specifications FF-H-116, except as otherwise specified herein. Loose pin hinges for reverse-bevel doors with locks shall be constructed in a manner that will eliminate removal of the pins when the doors are in the closed position. Determine correct clearance from the drawings. Provide non-removable pins on all doors. Provide five knuckle, concealed ball bearing hinges on all doors. Flat Button, top and bottom tips required on all butt hinges. Match existing size where doors or frames are being reused.

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1) Butt Hinge Length:

| <u>Door Thickness</u> | <u>Door Width</u> | <u>Hinge Height</u> |
|-----------------------|-------------------|---------------------|
| 1 3/4" door           | Where Req.        | 4 1/2"              |
| 1 3/4" door           | to 38"            | 4 1/2"              |
| 1 3/4" door           | over 38" to 48"   | 5"                  |
| 1 3/4" door           | over 48"          | 6"                  |

2) Number of Butt Hinges Required:

- aa) Doors 60" high and under: 2 butt hinges
- bb) Doors over 60" high and not over 90" high:  
3 butt hinges
- cc) Doors over 90" high and not over 120" high:  
4 butt hinges

3) Hinge Types: Shall conform to the applicable requirement of Specification FF-H-121c, except as specified otherwise herein.

- aa) Interior doors: 5BB1
- bb) Exterior doors: 5BB1

(2) Door Locks:

- a. Shall conform to the applicable requirements for Series 161 of Specification FF-H-106, except as otherwise specified herein. The series selected shall, as far as practicable, be used throughout the project. All lock and latch sets of a series shall be the products of a single manufacturer. Lock cylinders shall have not less than six pin tumblers. Accessories such as door coordinators shall conform to the applicable requirements of Specification FF-H-106a (1). Lock and latch design, style and application shall meet handicapped access standards and codes where applicable.
- b. All locksets to be heavy duty. Cylindrical Type: Schlage "ND" Rhodes design or as listed in hardware sets. Functions as listed in hardware sets.
- c. Provide locks and latchsets with 2-3/4" backset, unless otherwise noted. Provide strikes with extended lip where required to protect trim from being marked by latch bolt. Provide at wood frames and/or wood doors (when in pairs) wrought boxes.

(3) Door Closers:

- a. Door closers shall meet handicapped access standards and

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codes. Complying with ANSI A117.1 for door opening force and delayed action closing.

- b. Surface mounted LCN 4040XP Series 689 Finish, spray to match other hardware, with three (3) separate control valves (including back check), ANSI Grade I. Closers to be equipped with size adjustment (1 thru 6). All closers shall be mounted on the inside of the room wherever possible. Where parallel arm closers are used extra duty EDA arm.

(4) Exit Devices:

- a. Von Duprin 99 series
- b. U.L. approved for Casualty.
- c. Provide cylinders as required for exit device and proper operation
- d. Lever design to match locksets, types functions as listed in hardware sets

(5) Kickplates: Shall be .050 (minimum) stainless steel 12 inches high, by 1 ½" inches less than door width for single doors and one inch less than the width for double doors. Finish, 630.

(6) Stops and Bumpers: Wall type WS401/WS402 series with proper anchor selected for substrate. Floor stops FS18S shall be used on exterior doors where required.

(7) Silencers: Supply 3 each at jambs of single doors and 2 each at pairs of doors.

(8) Flush Bolts:

- a. Flush bolts: Type FB458 series as required.

Furnish flush bolts with dust proof strikes DP2, not required when used with thresholds.

(9) Weatherstrip and Seals:

- a. Sweeps shall be Type 39A or as listed in hardware sets.
- b. Weatherstrip shall be Type 8303A or as listed in hardware sets.

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- (10) Thresholds: Shall be type 8655A or as detailed on plans or listed in the Hardware Sets.
- (11) Push Plates: Shall be .050 thick (minimum), 6 x 16 type 8200 finish 630 all edges beveled or as listed in hardware sets.
- (12) Pull Plates: Shall be .050 thick (minimum), 6 x 16, edges beveled, Type 8302-10. Mount with thru-bolts, or as listed in hardware sets. Solid material finish 630.

D. Hardware Finishes:

- (1) Provide matching finishes for hardware units at each door or opening, to the greatest extent possible, except as otherwise indicated. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening. In general, match items to the manufacturer's standard finish for the latch and lock set (or push-pull units if no latch-lock sets) for color and texture.
- (2) Provide finishes which match those established by BHMA or, if none established, match the Architect's sample.
- (3) Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than specified for the applicable units of hardware by referenced standards.
- (4) Provide protective lacquer coating on exposed hardware finishes or brass, bronze and aluminum, except as otherwise indicated. The suffix "-NL" is used with standard finish designations to indicate "no lacquer".
- (5) The designations used in schedules and elsewhere to indicate hardware finishes are those listed in "Materials & Finishes Standard 1301" by BHMA, including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

E. Lock Cylinders and Keying:

- (1) General: All doors this project shall be master keyed as directed by owner. Supplier shall meet with Owner to finalize keying requirements and obtain final instructions in writing. Use Schlage IC Cores, No Substitutions.

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- (2) Provide construction keying at all doors. Permanent keys shall not be under any circumstance made available to the General Contractor. Furnish 6 construction keys to the Contractor.
- (3) Comply with Owner's Instructions for master keying.
- (4) Key Quantity: Furnish 3 change keys for each lock; 6 master keys for each master system.

PART 3 EXECUTION

A. Examination:

- (1) Prior to hardware installation, the supplier/installer shall examine the hollow metal door frames and other surfaces to receive hardware for accuracy of installation and alignment. The supplier/installer shall report in writing to the Contractor with a copy to the Architect, of detrimental conditions. Failure to perform this requirement constitutes a waiver to subsequent claims to the contrary and holds the supplier/installer responsible for corrections the Architect may require. Commencement of Work shall be construed as acknowledgment by the supplier/installer that doors and frames and other surfaces to receive hardware are in compliance with the requirements of the Contract Documents.

B. Preparation:

- (1) The supplier/installer shall meet with the Owner, Architect, and related trades prior to the Commencement of Work. Tag items or packages with identification related to the final hardware schedule, and include basic installation instructions in the package.
- (2) Deliver hardware items at the proper times to the proper locations (ship to project site) for installation.

C. Installation:

- (1) Install each hardware item in compliance with the manufacturer's instructions and recommendations.
- (2) Mount hardware units at heights as recommended per SDI-100, except as specifically indicated or required to comply with governing regulations, and except as may be directed otherwise by Architect.
- (3) Application of Hardware: Hardware shall be installed in a neat, workmanlike manner following the manufacturer's instructions.

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Fasteners, supplied with the hardware, shall be used to secure the hardware in place. Wood screws shall be used for securing hardware to wood surfaces. Machine screws, set in expansion shields, shall be used for securing hardware to concrete or masonry surfaces. Thru-bolts shall be used where specified or where necessary for satisfactory installation.

- (4) Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, coordinate removal, storage and reinstallation or application of surface protection with finishing work specified in Division 9. Do not install surface-mounted items until finishes have been completed on the substrate. The Supplier/Installer shall be responsible for correct application according to factory installation instructions.
- (5) Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry.
- (6) Deliver hardware items at the proper times to the proper locations (shop or project site) for installation.

D. Field Quality Control:

- (1) Inspection: The supplier/installer shall provide a final inspection with the Owner, and Architect at the completion of the installation.
- (2) After hardware is checked, keys shall be tagged, identified and delivered to the Owner by registered mail, or delivered in person after receiving a signed receipt from a responsible representative of the Owner. Errors in cutting or fitting, or damage to adjoining work shall be repaired, as directed.

E. Adjusting:

- (1) Check and adjust each operating item of hardware and each door, to ensure proper operation or function for each unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.
- (2) Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area,

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return to the work during the week prior to acceptance or occupancy, and make final check and adjustment of hardware items in such space or area. Adjust door control devices to compensate for final operation of heating and ventilating equipment. Instruct Owner's personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

F. Cleaning:

- (1) Insure that after installation, the materials furnished and installed will be free of paint or lacquer as may appear from the Work of other subcontractors. Clean operating items as necessary to restore proper function and finish of hardware and doors.
- (2) During the course of the Work and on completion of the Work, remove excess materials, equipment and debris and dispose of away from premises. Leave Work in clean condition in accordance with Section 01500 Temporary Facilities.

G. Project Information:

- (1) Number OPT0365611, Date 03.21.2024, Version V1

H. Hardware Sets:

- (1) While the following hardware sets are intended to cover doors and establish a type and standard of quality, it shall be the specific duty and responsibility of the hardware supplier to examine the drawings and specifications and furnish proper hardware for openings. The hardware supplier shall compare the specifications with the door schedule and notify the Architect of errors, inconsistencies or omissions during the bid period.

~= Hardware Item Requiring Electrical Coordination

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HARDWARE GROUP NO. 01

For use on Door #(s):

Provide each SGL door(s) with the following:

| QT |    | DESCRIPTION | CATALOG NUMBER   |   | FINIS | MFR |
|----|----|-------------|------------------|---|-------|-----|
| Y  |    |             |                  |   | H     |     |
| 4  | EA | HINGE       | 5BB1HW 4.5 X 4.5 |  | 652   | IVE |
| 1  | EA | OFFICE LOCK | ND53TD RHO       |  | 626   | SCH |
| 1  | EA | PERM CORE   | 23-030           |  | 626   | SCH |
| 1  | EA | WALL STOP   | WS401/402CCV     |  | 626   | IVE |
| 3  | EA | SILENCER    | SR64             |  | GRY   | IVE |

THREE HINGES AT 7'-0" OPENINGS

HARDWARE GROUP NO. 02

For use on Door #(s):

Provide each SGL door(s) with the following:

| QT |    | DESCRIPTION    | CATALOG NUMBER       |   | FINIS | MFR |
|----|----|----------------|----------------------|---|-------|-----|
| Y  |    |                |                      |   | H     |     |
| 3  | EA | HINGE          | 5BB1HW 4.5 X 4.5 NRP |    | 652   | IVE |
| 1  | EA | STOREROOM LOCK | ND80TD RHO           |    | 626   | SCH |
| 1  | EA | PERM CORE      | 23-030               |   | 626   | SCH |
| 1  | EA | OH STOP        | 90S                  |  | 630   | GLY |
| 3  | EA | SILENCER       | SR64                 |  | GRY   | IVE |

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HARDWARE GROUP NO. 03

For use on Door #(s):

108A            506C            H500

Provide each SGL door(s) with the following:

| QT |    | DESCRIPTION    | CATALOG NUMBER         |   | FINIS | MFR |
|----|----|----------------|------------------------|---|-------|-----|
| Y  |    |                |                        |   | H     |     |
| 3  | EA | HINGE          | 5BB1HW 5 X 4.5 NRP     |  | 630   | IVE |
| 1  | EA | PANIC DEVICE   | CD-XP99-NL-OP          |  | 626   | VON |
| 1  | EA | RIM CYLINDER   | 20-057 ICX             |  | 626   | SCH |
| 1  | EA | CD MORT CYL    | 20-061 XQ11-948        |  | 626   | SCH |
| 2  | EA | PERM CORE      | 23-030                 |  | 626   | SCH |
| 1  | EA | DOOR PULL      | VR910 NL               |  | 630   | IVE |
| 1  | EA | SURFACE CLOSER | 4040XP SCUSH           |  | 689   | LCN |
| 1  | EA | KICKPLATE      | 8400 10" X 2" LDW B-CS |  | 630   | IVE |
| 1  | EA | RAIN DRIP      | 142AA                  |  | AA    | ZER |
| 1  | EA | WEATHERSTRIP   | 8303AA                 |  | AA    | ZER |
| 1  | EA | SWEEP          | 39A                    |  | A     | ZER |
| 1  | EA | THRESHOLD      | 8655A-223              |  | A     | ZER |

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HARDWARE GROUP NO. 04

For use on Door #(s):

Provide each PR door(s) with the following:

| QT |     | DESCRIPTION      | CATALOG NUMBER       |   | FINIS | MFR |
|----|-----|------------------|----------------------|---|-------|-----|
| Y  |     |                  |                      |   | H     |     |
| 8  | EA  | HINGE            | 5BB1HW 4.5 X 4.5 NRP |    | 630   | IVE |
| 1  | EA  | REM MULLION      | KR9954 STAB          |    | 689   | VON |
| 1  | EA  | PANIC DEVICE     | CD-XP99-NL-OP        |    | 626   | VON |
| 1  | EA  | PANIC DEVICE     | XP99-EO              |    | 626   | VON |
| 1  | EA  | RIM CYLINDER     | 20-057 ICX           |    | 626   | SCH |
| 1  | EA  | CD MORT CYL      | 20-061 XQ11-948      |    | 626   | SCH |
| 1  | EA  | MORTISE CYLINDER | 20-061               |    | 626   | SCH |
| 3  | EA  | PERM CORE        | 23-030               |    | 626   | SCH |
| 1  | EA  | DOOR PULL        | VR910 NL             |    | 630   | IVE |
| 2  | EA  | SURFACE CLOSER   | 4040XP EDA           |    | 689   | LCN |
| 2  | EA  | FLOOR STOP       | FS18S                |    | BLK   | IVE |
| 1  | EA  | MULLION SEAL     | 8780N                |    | BK    | ZER |
| 1  | SET | SEALS            | BY FRAME MFG         |   | A     | ALF |
| 2  | EA  | SWEEP            | 39A                  |   | A     | ZER |
| 1  | EA  | THRESHOLD        | 8655A-223            |  | A     | ZER |

END OF SECTION

## 088000 GLAZING

1. SCOPE: Furnish all labor, equipment, and material required for the complete installation of all glass and glazing.
2. MATERIALS:
  - A. Glass, factory labeled, each panel, and not removed until final cleaning. Pittsburgh, Viracon, St. Gobain, P.P.G., Guardian or equal.
  - B. Exterior Insulated Glass:
    - (1) 1" thick insulating glass.
    - (2) Interior light shall be 1/4" clear.
    - (3) Exterior light shall be 1/4" Solarban Z75 Clear low reflectance, low emissivity glass, tempered where required, as manufactured by PPG, Viracon, HGP or equal.
      - a. UV Transmittance: 6%
      - b. Visible Light Transmittance: 48%
      - c. Solar Energy Transmittance: 19%
      - d. Visible Light Reflectance: 9%
      - e. Solar Energy Reflectance: 29%
      - f. U-Value (winter): 0.28
      - g. U-Value (summer): 0.26
      - h. Shading Coefficient: 0.28
      - i. Solar Heat Gain Coefficient: 0.24
      - j. Light to Solar Gain (LSG): 2.00
  - C. Interior Insulated Glass Assembly (in acoustical walls):
    - (1) Two 1/8" panes laminated glass one side.
    - (2) One 3/8" pane tempered glass opposite side.
  - D. Mirrors: 1/4" Polished plate glass, polished edge.
  - E. Door Laminated Safety Glass: Two 1/8" panes laminated. Globe-Amerada, P.P.G., Guardian or equal.
  - F. Interior Fixed Glass: 1/4" clear, tempered where required.
  - G. Laminated glass shall meet Federal Specification CPSC glazing standard 16 DFR 1201 Category 1 and 2. Solar gray at exterior.

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3. INSTALLATION:

- A. Glazing: Per Glazing Manual of Plate Glass Jobbers Association and plan details.
- B. Cleaning: Remove excessive glazing compound. General cleaning by General Contractor.
- C. Breakage: All glass breakage shall be the responsibility of the Contractor until the work has been completed and the contract fully performed.

END OF SECTION  
END OF DIVISION

**DIVISION 9 - FINISHES**

**092216 NON-STRUCTURAL METAL FRAMING**

1. SCOPE:
  - A. Include all labor, materials and equipment necessary for a complete installation as shown or specified.
  - B. Install all materials in accordance with manufacturer's requirements.
  - C. Related Sections: All work in this section shall be coordinated with the following sections:
    - (1) 092900 Gypsum Board
2. MATERIALS:
  - A. Manufacturer: Milcor, Keene, Western Metal, or approved equal.
  - B. Wall track at ceiling and floor shall be 20 gage, as detailed, hot dipped galvanized steel with not less than 1-1/4" flanges and of proper width for studs selected.
  - C. Studs shall be 20 gage, as detailed, hot dip galvanized steel. Webs shall be pre-punched at 24" o.c. Contractor shall consult manufacturer's limiting height tables and shall adjust gauge as necessary to be in conformance therewith.
  - D. Resilient Furring Channels: RC-1.
  - E. Metal Furring Channels: DWC-25 or DWC-20 as required.
  - F. 1-1/2" x 16 gauge cold rolled channels.
  - G. 1-1/2" x 12" gauge cold rolled channels.
  - H. Furring Channel clips.
  - I. 8 gauge galvanized tie wire.
  - J. Screws: 3/8" Type S, self-drilling, self-tapping, pan head.
  - K. Additional accessories, clips, braces, etc. as may be required by the manufacturer.

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**092900 GYPSUM BOARD**

1. GENERAL:

- A. The Contractor shall furnish all labor and materials to render a complete gypsum wallboard system installation.
- B. Submit painted sample of finish texture on 24" x 24" piece for approval prior to commencing work. Finish level shall be Gypsum Association Level 3 on all walls except those receiving graphics. Walls receiving graphics shall have a Level 5 Finish Level.
- C. Related Sections: All work described in this Section shall be coordinated with the following Sections:
  - (1) Section 092216: Non-structural Metal Framing
- D. Reference Standards:
  - (1) The Gypsum Association.
  - (2) United States Gypsum Company, Gypsum Construction Handbook.

2. MATERIALS:

- A. Gypsum Wallboard:
  - (1) Typical: 5/8" thick, Type 'X', ASTM C-36, SW tapered edges.
  - (2) Wet Locations: 5/8" thick, Type 'X', moisture and fire resistant wallboard, mold resistant and paperless, complying with ASTM C1178C and 1178M: National Gypsum Gold Bond eXP Tile Backer, Georgia Pacific DensShield Tile Backer, Certainteed M2 Tech Moisture and Mold Resistant Gypsum Board or similar.
- B. Gypsum Sheathing: 5/8" DensGlass Gold or equal
- C. Exterior Soffits: 5/8" Exterior Gypsum Soffit board; 5/8" DensGlass Gold at soffits receiving Direct Applied Finish System (DAFS).
- D. Sound Board: 1/2" Homasote 440 Sound Barrier
- E. Wallboard Casings: (galvanized)
  - (1) Corner bead: #800 Durabead

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- (2) "L" metal edge trim #200-B
- (3) "U" metal edge trim #200-A
- F. Screws: 1-1/4" Type "S" Buglehead.
- G. Tape and Cement: Approved manufacturer's materials.
- H. Texture: Light stipple in restrooms and food prep areas. Light hawk and trowel in all other areas except walls receiving graphics. Walls receiving graphics shall have a smooth level 5 finish.

3. INSTALLATION:

- A. Walls: Apply board, in maximum practical lengths, perpendicular to framing with ends occurring over firm bearing, end joints staggered ½ panel, field bearings screwed at 12" centers (5 per 48" width). End bearings screwed on 6" centers. Start at center of boards and work toward ends. Provide full panels over doors, no joints permitted.
- B. Screw apply casings per manufacturer's directions and install at all outside edges and at intersections with dissimilar materials.
- C. Wallboard panels shall be installed continuous over openings and extend at least one (1) full stud beyond the opening edge.
- D. Wallboard corners shall overlap utilizing floating corner and floating stud techniques, as required, with no gaps under corner bead. Corner bead shall be attached with screws, crimping is not permitted.
- E. Tape, cement, and sand wallboard surfaces. Apply thin cement layer, set tape into cement, let dry for 24 hours, and sand joints, texture entire area to uniform finish.
- F. Complete installed system shall conform to all manufacturer's requirements for support size and spacing and lateral bracing.
- G. Separate and dispose of and/or recycle gypsum products to the greatest extent possible.

END OF SECTION

## 095113 ACOUSTICAL PANEL CEILINGS

1. GENERAL:
  - A. Scope: Furnish all necessary materials, labor, and equipment for the complete installation of a suspended system.
  - B. Upon completion of the work, furnish owner with 20 tiles for future maintenance.
  - C. Related Section: 092900 Gypsum Wallboard.
  - D. Submit samples of grid and panel material as well as manufacturer literature in accordance with Section 013300.
2. MATERIALS:
  - A. Suspension System:
    - (1) Exposed grid, Prelude XL as manufactured by Armstrong CLG Systems for 2x4 grid. Use components shall have 5/16" exposed capped face: and be "intermediate duty": main beams item no. 7300 (12 feet long)  
Cross Tee: Item no. XL7342 (48")  
Item no. XL7328 (24")  
Wall moldings: Item no. 7800 (12 feet long)
    - (2) Color: White
    - (3) Hanger Wire: 12 gage, galvanized.
    - (4) Trim at Ceiling Grid "Clouds": AXIOM Classic as manufactured by Armstrong; 8" in classrooms and special education area; 12" in all other locations; color - white.
  - B. Acoustical Materials:
    - (1) Wrestling Room:
      - a. Lay-in panels, 3/4" x 24" x 48".
      - b. Color/Light Reflectance Minimum: White/.87
      - c. Armatuff by Armstrong, or equal by USG or prior approved equal. Armstrong #860
    - (2) Equal products by USG, Armstrong, or prior approved equal.

3. INSTALLATION:

- A. Furnish and install all framing for suspended ceilings in accordance with manufacturer's directions.
- B. All components, fastenings, and methods shall be selected for the actual ceiling loading and the specific structural conditions. Size to prevent deflection in excess of 1/360th of the span of any member.
- C. Surface shall be level and true to 1/8" tolerance in 10 feet.
- D. Finished work shall be free from dirt, discoloration, defects or objectionable variation in color.
- E. Install continuous edge molding at all edges where tile intersects walls.
- F. Separate and recycle waste materials to the greatest extent possible.

END OF SECTION

## **096513 - RESILIENT BASE AND ACCESSORIES**

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Section Includes:
  - 1. Resilient base.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

#### 1.3 QUALITY ASSURANCE

- A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
  - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

#### 1.4 PROJECT CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.
- B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.
- C. Install resilient products after other finishing operations, including painting, have been completed.

### PART 2 - PRODUCTS

#### 2.1 RESILIENT BASE

- A. Resilient Base:

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1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Armstrong World Industries, Inc.
  - b. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
  - c. Flexco, Inc.
  - d. Johnsonite.
  - e. Mondo Rubber International, Inc.
  - f. Roppe Corporation, USA.
- B. Resilient Base Standard: ASTM F 1861.
  1. Material Requirement: Type TS (rubber, vulcanized thermoset).
  2. Manufacturing Method: Group I (solid, homogeneous).
  3. Style: Cove (base with toe).
- C. Minimum Thickness: 0.125 inch (3.2 mm).
- D. Height: 6 inches (152.4 mm).
- E. Lengths: Coils in manufacturer's standard length. 48" pieces not acceptable.
- F. Outside Corners: Preformed.
- G. Inside Corners: Job formed.
- H. Finish: As selected by Architect from manufacturer's full range.
- I. Colors and Patterns: As selected by Architect from full range of industry colors.

## 2.2 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.
  1. Use adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
    - a. Cove Base Adhesives: Not more than 50 g/L.
    - b. Rubber Floor Adhesives: Not more than 60 g/L.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
  - 4. Moisture Testing: Perform tests recommended by manufacturer and as follows. Proceed with installation only after substrates pass testing.
    - a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    - b. Perform relative humidity test using in situ probes, ASTM F 2170. Proceed with installation only after substrates have maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- D. Do not install resilient products until they are same temperature as the space where they are to be installed.
  - 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

### 3.2 RESILIENT BASE INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient base.

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- B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
- C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.
- D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
- E. Do not stretch resilient base during installation.

3.3 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Floor Polish: Remove soil, visible adhesive, and surface blemishes from resilient stair treads before applying liquid floor polish.
  - 1. Apply two coats.
- C. Cover resilient products until Substantial Completion.

END OF SECTION 096513

**099000 PAINTING**

1. SCOPE:

- A. Paint all surfaces not factory pre-finished, interior and exterior.
- B. Regulatory requirements: Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specification, comply with the more stringent provisions.
- C. Maintenance Materials:
  - (1) Contractor shall furnish to the Owner one (1) full gallon of each color and each finish.
  - (2) Containers shall be sealed tight and clearly labeled for identification.
  - (3) Maintenance material shall be new material, not opened or used material.
- D. Submittals:
  - (1) All materials submitted for approval must be accompanied by product information showing raw material composition.
  - (2) Contractor shall submit paint chips for color and texture selections. Three sets to the Architect for approval.
  - (3) When requested by the Architect, the Contractor shall submit a 12 inch by 12 inch sample of any paint finish. Paint finish sample shall be applied to identical type of materials to which it will be applied on the job. Identify samples with color name and number and location on the job.
  - (4) Paint colors shall be selected by Architect.
- E. Delivery, Storage and Handling:
  - (1) All materials shall be delivered to site in manufacturer's unbroken sealed containers. Each container shall be labeled by the manufacturer giving manufacturer's name, type of paint, label analysis, color and instruction for mixing and reducing.

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- (2) Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45E F.
- (3) Take precautionary measures to prevent fire hazards and spontaneous combustion.

F. Environmental conditions:

- (1) Surfaces to receive paint materials shall be dry.
- (2) Minimum application temperature for latex paints is 45E F.

G. Protection:

- (1) Adequately protect surfaces not being painted. Repair or replace all items and surfaces damaged as a result of inadequate protection.
- (2) Place waste which may constitute a fire hazard in closed metal containers and remove daily from site, or more often, if required.
- (3) Remove electrical plates, surface hardware, fittings and fastenings prior to painting. These items shall be stored, cleaned and replaced on completion of work in each area. Solvent used to clean hardware shall not remove permanent lacquer finish.
- (4) Provide "WET PAINT" signs to protect newly painted surfaces.
- (5) At the completion of work of other trades, touch up and restore damaged painted surfaces interior and exterior.

H. Painting at Patched Areas:

- (1) Painting at patched and repaired areas designated on the drawings will be limited to the immediate repaired area and extend two feet beyond the repair in all directions unless noted otherwise. Paint color shall match as closely as possible existing colors.

2. MATERIALS:

- A. The following manufacturer's top-of-the-line, first quality products are acceptable. If use of equal products manufactured by others is desired, a list of proposed products including technical brochures shall be submitted for prior approval. Contractor will furnish to the Architect manufacturer's numbered invoices showing material types and quantities used on this project.

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- (1) Dunn-Edwards Corp.
- (2) Sherwin-Williams
- (3) ICI
- (4) Frazee

B. Manufacturer's catalog names and number of paint types in this Section are based on products of Dunn Edwards and is the standard of quality against which the Architect will judge equivalency. The quantity of titanium dioxide, the use of clays, aluminum silicate, talc and the purity of acrylic materials are some of the criteria which will be used by the Architect in evaluating the equivalency of submitted materials. No lead shall be utilized in the composition of any paint products.

3. INSTALLATION:

A. Workmanship: Preparation, application, workmanship, completion, and acceptance in accordance with manufacturer's recommendations and applicable provisions of "Painting Specification Manual" by P.D.C.A. for Type 1 Standard Job.

B. Preparation of Surfaces:

- (1) Wood: Sandpaper to a smooth and even surface and then dust with a cloth dampened with turpentine in order to completely remove all traces of sanding particles. Nail holes puttied, knots or pitch pockets sealed with shellac.
- (2) Concrete: Thoroughly clean surfaces of all loose material and form release agents.
- (3) Galvanized Metal: Thoroughly clean with solvent and prime with galvanized metal primer.
- (4) Ferrous Metal: Scale and rust removed, cleaned, primed with rust-inhibitive metal primer.
- (5) Back Priming: Exposed wood frames and trim, back-primed with one coat of Woodlife.
- (6) General: Before painting, remove hardware, accessories, plates, lighting fixtures, and similar items or provide ample protection. Replace all items upon completion of the work.

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- (7) Where surfaces are to receive aliphatic or epoxy coatings, caulk joint between floor and wall and at all intersections of dissimilar materials.
- (8) Previously Painted Surfaces: Wash with tri-sodium phosphate. Remove loose paint and rust and apply primer.
- (9) Surface Wireways and Conduits: Sand surfaces to remove sheen. Prime with Versaprime. Apply final coats within 7 days.
- (10) Exterior Metal:
  - a. Power wash or power sand all areas to be painted, and use a mild detergent solution such as Mi-T-M SURFACE PREP, if required. Then rinse with clear clean water until all residue has been removed from all surfaces.

C. Application:

- (1) Manufacturer's representative shall conduct a pre-painting conference to familiarize himself with the work and to verify the compatibility of all products with the substrates.
- (2) The manufacturer's representative shall monitor the application of all aliphatic and epoxy coatings and shall provide certification, in writing, that the products have been installed properly.
- (3) The application of any painting material on any surface shall constitute an acceptance by the Contractor of such surface.
- (4) Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for the type of material being applied.
- (5) Apply each coat at the proper consistency according to product manufacturer.
- (6) All coats shall be thoroughly dry (minimum of 4 hours) before applying succeeding coats.
- (7) All necessary repairing of nail holes, cracks, plaster, drywall, doors, etc., shall be done after the prime coat. Patch surface with material of same color as finish. Repairs shall be brought flush with and match adjacent surfaces.

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- (8) Where clear finishes are required, ensure tint fillers match wood. Work fillers well into grain before set. Wipe off excess.
- (9) All edges of doors shall be finished same as the faces after fitting.
- (10) Hot spots and suction spots noticeable after application of first coat shall be neutralized and touched up before applying second coat. The last coat shall produce an even result.
- (11) Exposed piping, ductwork, conduits, and cable trays generally will be painted color and texture to match walls or ceilings next to it.
- (12) Final color coat shall show full coverage regardless of number of coats specified.
- (13) Paint all sheet metal and mechanical equipment exposed to view on roof as directed. Paint visible portions of flashings, asphaltic coatings, and cant strips to blend with wall surfaces.
- (14) All metal work (doors, frames, handrails, etc) and millwork shall be sprayed.

D. Mechanical and Electrical Equipment:

- (1) All exposed electrical conduit hangers, outlet boxes, junction boxes, galvanized covers, raceways, gutters, supporting frames, piping, ductwork, grilles, registers, etc. in rooms calling for paint shall be painted to match adjacent surface. Factory finished aluminum registers are to remain unpainted unless so noted.
- (2) Remove grilles, registers, covers and access panels from location and paint separately. Clean the back surfaces of all foreign matter.
- (3) Replace identification markings on mechanical and electrical equipment when painted or spattered.
- (4) Fire pull levers and fire control boxes shall not be painted; if painted by accident, replace at no expense to the Owner.
- (5) Sprinkler heads and smoke detectors shall not be painted. If painted, they shall be replaced.
- (6) Paint interior of air ducts that are visible through diffusers and registers with one (1) coat of flat black paint to the limit of sight line.

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(7) Paint exposed dampers to match face panels.

E. Cleaning:

- (1) Remove paint where spilled, splashed, or spattered immediately.
- (2) During progress of work, keep premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.
- (3) Upon completion of work, leave premises neat and clean to the satisfaction of the Architect.

F. Paint Schedule:

(1) Paint schedule lists minimum coats. Additional coats may be required to obtain color and uniformity and to hide, at no additional cost to the Owner.

(2) Interior Work:

a. Interior Gypsum Drywall (typical):

1 coat: Vinylastic Select (VNSL00), low-odor/zero-VOC interior latex prime

2 coats: Spartazero Eggshell (SZRO30) Low Sheen, low-odor/zero-VOC interior latex low sheen paint

b. Interior Gypsum Drywall (at wet areas):

1 coat: Vinylastic Select (VNSL00-1), low-odor/zero-VOC interior latex primer

2 coats: Carboline Sanitile 255, Semi-Gloss, interior acrylic-epoxy eggshell paint

c. Interior Metal, Ferrous:

1 coat: Bloc-Rust Premium (BRPR00-1-WH), interior/exterior waterborne alkyd rust-preventative metal primer

2 coats: EverShield (EVSH50-3), low-odor / low-VOC interior/exterior acrylic semi-gloss paint

d. Interior Metal, Non-Ferrous:

1 coat: Ultra-Grip Premium (UGPR00), acrylic multi-purpose primer

2 coats: EverShield (EVSH50-3) low-odor / low-VOC interior/exterior acrylic semi-gloss paint

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- e. Interior Wood:
  - 1 coat: Inter-Kote Premium (IKPROO) Primer, low-odor/zero-VOC interior latex primer
  - 2 coats: Spartazero Eggshell (SZRO30) Low Sheen, low-odor/zero-VOC interior latex low sheen paint
- f. Interior Masonry:
  - 1 coat: Ultra-grip Premium (UGPR00), acrylic multi-purpose primer
  - 2 coats: SpartaShield (SSHL30) low-odor / low-VOC exterior acrylic eggshell paint

(3) Exterior Work:

- a. Exterior Metal, Ferrous:
  - 1 coat: Bloc-Rust Premium (BRPR00-1-WH), interior/exterior waterborne alkyd rust-preventative metal primer
  - 2 coats: EverShield (EVSH50-3), low-odor / low-VOC interior/exterior acrylic semi-gloss paint
- b. Exterior Metal, Non-Ferrous:
  - 1 coat: Ultra-Grip Premium (UGPR00), acrylic multi-purpose primer
  - 2 coats: EverShield (EVSH50-3), low-odor / low-VOC interior/exterior acrylic semi-gloss paint
- c. Exterior Stucco/EIFS:
  - 1 coat: Eff-Stop Premium (ESPR00), acrylic masonry primer/sealer
  - 2 coats: EverShield (EVSH10-3), low-odor/low-VOC exterior acrylic flat paint
- d. Exterior Painted Wood:
  - 1 coat: E-Z Prime Preumium (EZPR00), exterior acrylic wood primer
  - 2 coats: Acri-Flat Spartasheild (SSHL10), exterior 100% Acrylic Flat Paint acrylic wood stain & masonry flat paint
- e. Exterior Masonry:

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Refer to Section 071900 Water Repellants and Anti-Graffiti  
Coatings and Stains

END OF SECTION  
END OF DIVISION

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L. Acoustical Sealant

- (1) Non-hardening, non-drying, non-bleeding, synthetic rubber-based material conforming to ASTM D-217.

3. INSTALLATION:

- A. Attach framing securely to building structure. Fasten partition track at 2'-0" o.c. in accordance with manufacturer's requirements. Use fasteners suitable for material track is fastened to. The use of powder driven anchors is allowed if installed with minimum 1" long shot pins (.145 shank size) used with the correct load. Set partition track in a continuous bead of sealant.
- B. Provide double 20 gauge studs at all openings anchor to structure above, in accordance with the details shown in the drawings. Integrally reinforce.
- C. Maximum stud spacing shall be 16" o.c.
- D. Coordinate with other trades for provisions for blocking, metal backing plates, special anchors, etc.
- E. Install all components and accessories in strict accordance with the manufacturer's recommendations.
- F. Some partitions extend to the bottom of the structure above. Refer to drawings. Provide for expansion and deflection of the building structure as recommended by the manufacturer.
- G. Provide 16 gauge studs and solid 2x fire treated wood blocking at all walls supporting shelving or cabinets.
- H. Provide channel bracing at mid-height of all walls, or at 6'-0" o.c. vertically where walls exceed 12'-0" in height. Minimum 3/4" cold rolled channel with clips at each stud.
- I. Framing of Intersections:
  - (1) Provide three studs or floating stud at all exterior and interior corners.
  - (2) Provide floating corner at ceiling/wall intersections, except at fire rated walls.

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- J. Provide acoustical sealant around entire perimeter of sound rated partitions.
- K. Provide 3 beads sealant. One at the center of the floor or ceiling track and end wall studs, one at the edge of gypsum wallboard at each face.
- L. Caulk perimeter of all electrical junction boxes, and pipe penetrations. Coordinate with fire stopping requirements.
- M. Separate and recycle waste materials to the greatest extent possible.

END OF SECTION

**DIVISION 10 - SPECIALTIES**

**101100 VISUAL DISPLAY UNITS**

1. SCOPE:

- A. Furnish labor and materials to complete all tackboards as indicated on the drawings and hereinafter specified.
- B. Backing: Where necessary, provide and install backing for attachment of boards. Locate backing so they are completely hidden.
- C. All units shall be manufactured in the supplier's factory and shipped to the job ready to fasten to the wall.
- D. Sizes and lengths shall be as shown on the drawings, using standard board sizes unless shown otherwise. Field verify all conditions.
- E. Provide maintenance instructions for markerboards in accordance with Section 013300.

2. MATERIALS:

Products listed below are as manufactured by Claridge. Equal products by Greensteel, Ghent, ADP Lemco, or approved equal.

A. Tackboards:

- (1) Fabricork #1381 FREW on 7/16" fire retardant Duracore with wrapped edges, 1/4" hardboard backing and heavy gauge aluminum frame.
- (2) Vinyl color shall be selected by the Owner from the manufacturer's standard color charts.

B. Markerboards -magnetic with surface suitable for digital projection.

- (1) Polyvision: 100 Series
- (2) Claridge Series 3 with LCS3 porcelain
- (3) ADP Lemco: A, Type 3 trim, No. 252
- (4) Provide (2) map hooks for each 4 feet of map rail.
- (5) Provide (1) flag holder for each room with markerboard.

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(6) Provide tray.

C. Outdoor enclosed Bulletin board Cabinet

(1) Balt 3 Door unit 72"w x 36"h, Silver trim, Locking doors. Tack board color to be selected.

3. INSTALLATION:

A. Experienced workmen shall install all markerboards and tackboards, and shall be securely fastened to the wall straight and plumb with no visible fasteners.

END OF SECTION

## **104413 FIRE PROTECTION CABINETS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes fire-protection cabinets for portable fire extinguishers.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For fire-protection cabinets.

#### **1.3 CLOSEOUT SUBMITTALS**

- A. Maintenance data.

#### **1.4 COORDINATION**

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

#### **2.2 FIRE-PROTECTION CABINET**

- A. Cabinet Type: Suitable for fire extinguisher.
  - 1. Basis of Design: Larsen's Architectural Series, model 2409-5R and 2409-SM.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Fire-End & Croker Corporation
    - b. Guardian Fire Equipment, Inc.
    - c. JL Industries, Inc.
    - d. Modern Metal Products

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e. Potter roemer LLC

- B. Cabinet Construction: Nonrated.
- C. Cabinet Material: Cold-rolled steel sheet.
- D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
  - 1. Rolled-Edge Trim: 2-1/2-inch backbend depth.
- E. Surface-Mounted Cabinet: Cabinet box fully exposed and mounted directly on wall with no trim.
- F. Cabinet Trim Material: Steel sheet.
- G. Door Material: Steel sheet.
- H. Door Style: Vertical duo panel with frame.
- I. Door Glazing: Acrylic sheet.
  - 1. Acrylic Sheet Color: Clear transparent acrylic sheet.
- J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
- K. Accessories:
  - 1. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
  - 2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
    - a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
      - 1) Location: Applied to cabinet door.
      - 2) Application Process: Silk-screened.
      - 3) Lettering Color: Red.
      - 4) Orientation: Vertical.
- L. Materials:

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1. Cold-Rolled Steel: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
  - a. Finish: Baked enamel or powder coat.
  - b. Color: As selected by Architect from full range of industry colors and color densities.
2. Transparent Acrylic Sheet: ASTM D 4802, Category A-1 (cell-cast sheet), 3 mm thick, with Finish 1 (smooth or polished).

### 2.3 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.
- B. Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at heights acceptable to authorities having jurisdiction.
- C. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
- D. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

END OF SECTION

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## **104416 FIRE EXTINGUISHERS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

- A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.

#### **1.2 ACTION SUBMITTALS**

- A. Product Data: For each type of product.

#### **1.3 INFORMATIONAL SUBMITTALS**

- A. Warranty: Sample of special warranty.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data.

#### **1.5 COORDINATION**

- A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

#### **1.6 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Six years from date of Substantial Completion.

### **PART 2 - PRODUCTS**

#### **2.1 PERFORMANCE REQUIREMENTS**

- A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

## 2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

- A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet and mounting bracket indicated.
  - 1. Basis of Design Product: JL Industries Cosmic 5E and Saturn Class K Wet Chemical (kitchen).
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation
    - b. Ansul Incorporated
    - c. Guardian Fire Equipment, Inc.
    - d. JL Industries, Inc.
    - e. Larsens Manufacturing Company
    - f. Potter Roemer LLC.
  - 3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.
- B. Multipurpose Dry-Chemical Type: UL-rated nominal capacity, with monoammonium phosphate-based dry chemical in manufacturer's standard enameled container.

## 2.3 MOUNTING BRACKETS

- A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.
  - 1. Basis of Design Product: JL Industries MB810A.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Amerex Corporation
    - b. Ansul Incorporated
    - c. Guardian Fire Equipment, Inc.
    - d. JL Industries, Inc.
    - e. Larsens Manufacturing Company
    - f. Potter Roemer LLC
- B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
  - 1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

- a. Orientation: Vertical.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Examine fire extinguishers for proper charging and tagging.
  1. Remove and replace damaged, defective, or undercharged fire extinguishers.
- B. Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
  1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.
- C. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION  
END OF DIVISION

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**DIVISION 13 - SPECIAL CONSTRUCTION**

**131250 METAL BUILDING SYSTEMS**

1. GENERAL

A. RELATED DOCUMENTS

- (1) Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. SUMMARY

- (1) Section Includes:
  - a. Structural-steel framing.
  - b. Metal roof panels.
  - c. Metal wall panels.
  - d. Thermal insulation.
  - e. Accessories.

C. DEFINITIONS

- (1) Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in referenced standards.

D. ACTION SUBMITTALS

- (1) Product Data: For each type of metal building system component. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
  - a. Structural-steel-framing system.
  - b. Metal roof panels.
  - c. Metal wall panels.
  - d. Metal liner panels.

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- e. Insulation and vapor retarder facings.
  - f. Flashing and trim.
  - g. Accessories.
- (2) Shop Drawings: Furnish shop drawings in accordance with Section 013300 Shop Drawings and Samples, for the following metal building system components. Include plans, elevations, sections, details, and attachments to other work.
- a. Anchor-Bolt Plans: Submit anchor-bolt plans and templates before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.
  - b. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
  - c. Metal Roof and Wall Panel Layout Drawings: Show layouts of metal panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
  - d. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:8):
    - i. Flashing and trim.
    - ii. Louvers.
- (3) In reviewing shop drawings, the Architect / Engineer will attempt to detect omissions and major errors, but neither failure of the Architect / Engineer to do this nor the review of the shop drawings shall relieve the Contractor of their responsibility to comply with the Drawings and Specifications. Approval of shop drawings in no way relieves the Contractor or fabricator of their responsibility for all errors of detailing, fabrication and erection, and for the correct fitting of structural members.

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- (4) Samples for Initial Selection: For units with factory-applied color finish.
- (5) Samples for Verification: For each type of exposed finish required, prepared on Samples of sizes indicated below:
  - a. Metal and Translucent Panels: Nominal 12 inches (300 mm) long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
- (6) Delegated-Design Submittal: For metal building systems indicated to comply with performance requirements and design criteria, including analysis data, shall be sealed by a professional civil or structural engineer registered in the State of Arizona.

E. INFORMATIONAL SUBMITTALS

- (1) Qualification Data: For qualified erector, manufacturer, or professional engineer.
- (2) Welding certificates.
- (3) Metal Building System Certificates: For each type of metal building system, from manufacturer.
  - a. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
    - i. Name and location of Project.
    - ii. Order number.
    - iii. Name of manufacturer.
    - iv. Name of Contractor.
    - v. Building dimensions including width, length, height, and roof slope.
    - vi. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
    - vii. Governing building code and year of edition.
    - viii. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
    - ix. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.

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- x. Building-Use Category: Indicate category of building use and its effect on load importance factors.
  - xi. AISC Certification for Category MB: Include statement that metal building system and components were designed and produced in an AISC-Certified Facility by an AISC-Certified Manufacturer.
- (4) Erector Certificates: For each product, from manufacturer.
  - (5) Manufacturer Certificates: For each product, from manufacturer.
  - (6) Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for insulation and vapor-retarder facings. Include reports for thermal resistance, fire-test-response characteristics, water-vapor transmission, and water absorption.
  - (7) Source quality-control reports.
  - (8) Field quality-control reports.
  - (9) Surveys: Show final elevations and locations of major members. Indicate discrepancies between actual installation and the Contract Documents. Have surveyor who performed surveys certify their accuracy.
  - (10) Warranties: Sample of special warranties.

F. CLOSEOUT SUBMITTALS

- (1) Maintenance Data: For metal panel finishes to include in maintenance manuals.

G. QUALITY ASSURANCE

- (1) Manufacturer Qualifications: A qualified manufacturer.
  - a. IAS AC 472 accredited plant by manufacturer.
  - b. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.
- (2) Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

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- (3) Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- (4) Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.
- (5) Welding Qualifications: Qualify procedures and personnel according to the following:
  - a. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
  - b. AWS D1.3, "Structural Welding Code - Sheet Steel."
- (6) Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for design requirements and allowable stresses.
- (7) Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.
- (8) Preinstallation Conference: Conduct conference at Project site.
  - a. Review methods and procedures related to metal building systems including, but not limited to, the following:
    - i. Condition of foundations and other preparatory work performed by other trades.
    - ii. Structural load limitations.
    - iii. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
    - iv. Required tests, inspections, and certifications.
    - v. Unfavorable weather and forecasted weather conditions.
  - b. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
    - i. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
    - ii. Structural limitations of purlins and rafters during and after roofing.
    - iii. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.

- iv. Temporary protection requirements for metal roof panel assembly during and after installation.
- v. Roof observation and repair after metal roof panel installation.
- c. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
  - i. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
  - ii. Structural limitations of girts and columns during and after wall panel installation.
  - iii. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
  - iv. Temporary protection requirements for metal wall panel assembly during and after installation.
  - v. Wall observation and repair after metal wall panel installation.

#### H. DELIVERY, STORAGE, AND HANDLING

- (1) Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- (2) Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- (3) Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

#### I. PROJECT CONDITIONS

- (1) Weather Limitations: Proceed with installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.
- (2) Field Measurements:
  - a. Established Dimensions for Foundations: Comply with established dimensions on approved anchor-bolt plans, establishing foundation dimensions and proceeding with

fabricating structural framing without field measurements. Coordinate anchor-bolt installation to ensure that actual anchorage dimensions correspond to established dimensions.

- b. Established Dimensions for Metal Panels: Where field measurements cannot be made without delaying the Work, either establish framing and opening dimensions and proceed with fabricating metal panels without field measurements or allow for field trimming metal panels. Coordinate construction to ensure that actual building dimensions, locations of structural members, and openings correspond to established dimensions.

#### J. COORDINATION

- (1) Coordinate sizes and locations of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings.
- (2) Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

#### K. WARRANTY

- (1) Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
  - a. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
    - i. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - ii. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - iii. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - b. Finish Warranty Period: 10 years from date of Substantial Completion.
- (2) Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel

assemblies that leak or otherwise fail to remain weathertight within specified warranty period.

- a. Warranty Period: 20 years from date of Substantial Completion.

### 3. PRODUCTS

#### A. MANUFACTURERS

(1) Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Alliance Steel, Inc.
- b. American Buildings Company; Division of Magnatrax Corp.
- c. American Steel Building Co., Inc.
- d. Behlen Mfg. Co.
- e. Butler Manufacturing Co.; a BlueScope Steel company.
- f. Metallic Building Co.; Division of NCI Building Systems, L.P.
- g. Star Building Systems; an NCI company.
- h. USA, Inc.
- i. VP Buildings; a United Dominion company.
- j. Nucor Building Systems

#### B. METAL BUILDING SYSTEMS

(1) Description: Provide a complete, integrated set of metal building system manufacturer's standard mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

- a. Provide metal building system of size and with bay spacings, roof slopes, and spans indicated.

(2) Primary-Frame Type:

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- a. Rigid Clear Span: Solid-member, structural-framing system without interior columns.
- (3) Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.
- (4) Roof System: Manufacturer's standard vertical-rib, standing-seam metal roof panels with field-installed insulation.
- (5) Exterior Wall System: Manufacturer's standard tapered-rib, exposed-fastener metal wall panels with field-installed insulation.

C. METAL BUILDING SYSTEM PERFORMANCE

- (1) Delegated Design: Design metal building system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- (2) Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
  - a. Design Loads: As indicated on Drawings.
  - b. Deflection Limits: Design metal building system assemblies to withstand design loads with deflections no greater than the following:
    - i. Purlins and Rafters: Vertical deflection of  $1/180$  of the span for Dead Load only, and  $1/360$  for Live Load.
    - ii. Girts: Horizontal deflection of  $1/240$  of the span.
    - iii. Metal Roof Panels: Vertical deflection of  $1/240$  of the span.
    - iv. Metal Wall Panels: Horizontal deflection of  $1/240$  of the span.
    - v. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
  - c. Drift Limits: Engineer building structure to withstand design loads with drift limits no greater than the following:

- i. Lateral Drift: Maximum of H/400 of the building height for typical conditions. See also General Structural Notes on drawings.
    - d. Metal panel assemblies shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ASTM E 1592.
- (3) Seismic Performance: Metal building systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
- (4) Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - a. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- (5) Air Infiltration for Metal Roof Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of roof area when tested according to ASTM E 1680 at negative test-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- (6) Air Infiltration for Metal Wall Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) of wall area when tested according to ASTM E 283 at static-air-pressure difference of 1.57 lbf/sq. ft. (75 Pa).
- (7) Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at test-pressure difference of 2.86 lbf/sq. ft. (137 Pa).
- (8) Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E 331 at a wind-load design pressure of not less than 2.86 lbf/sq. ft. (137 Pa).
- (9) Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

#### D. STRUCTURAL-STEEL FRAMING

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- (1) Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
  - a. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
    - i. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Architect.
  - b. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
  - c. Long-Bay Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide interior columns fabricated from round steel pipes or tubes, or shop-welded, built-up steel plates.
  - d. Frame Configuration: One-directional sloped, load-bearing-wall type.
  - e. Exterior Column Type: Tapered.
  - f. Rafter Type: Uniform depth or tapered.
- (2) Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
  - a. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges.
    - i. Depth: As needed to comply with system performance requirements.
  - b. Purlins: Steel joists of depths indicated.

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- c. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
  - d. Flange Bracing: Minimum 2-by-2-by-1/8-inch (51-by-51-by-3-mm) structural-steel angles or 1-inch (25-mm) diameter, cold-formed structural tubing to stiffen primary-frame flanges.
  - e. Sag Bracing: Minimum 1-by-1-by-1/8-inch (25-by-25-by-3-mm) structural-steel angles.
  - f. Base or Sill Angles: Minimum 3-by-2-inch (76-by-51-mm) zinc-coated (galvanized) steel sheet.
  - g. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
  - h. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from steel sheet.
  - i. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
  - j. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
- (3) Canopy Framing / Overhangs / Eve Extensions: Manufacturer's standard structural-framing system, designed to withstand required loads; fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide frames with attachment plates and splice members, factory drilled for field-bolted assembly.
- (4) Bracing: Provide adjustable wind bracing as needed and as applicable:
- a. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 (345); or ASTM A 529/A 529M, Grade 50 (345); minimum 1/2-inch diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
  - b. Cable: Not allowed.

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- c. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
  - d. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
  - e. Bracing: Provide wind bracing using any method specified above, at manufacturer's option, but as approved by the architect.
- (5) Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated or hot-dip galvanized bolts for structural-framing components that are galvanized.
- (6) Materials:
- a. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
  - b. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
  - c. Plate and Bar: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or 55 (345 or 380); or ASTM A 529/A 529M, Grade 50 or 55 (345 or 380).
  - d. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
  - e. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
  - f. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55 (205 through 380), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480); or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80 (170 through 550), or High-Strength Low-Alloy Steel (HSLAS), Grades 45 through 70 (310 through 480).
  - g. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550), or High-Strength Low-Alloy Steel (HSLAS), Grades 50

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through 80 (340 through 550); with G60 (Z180) coating designation; mill phosphatized.

- h. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
  - i. Zinc-Coated Steel Sheet: ASTM A 653/ A 653M, Structural Steel (SS), Grades 33 through 80 (230 through 550,) or High-Strength Low-Alloy Steel (HSLAS), Grades 50 through 80 (340 through 550); with G90 (Z275) coating designation.
  - ii. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/ A 792M, Structural Steel (SS), Grade 50 or 80 (340 or 550); with Class AZ50 (AZM150) coating.
- i. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), carbon-steel, hex-head bolts; ASTM A 563 (ASTM A 563M) carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
- i. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- j. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
  - i. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- k. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers, plain.
- l. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex-head steel structural bolts with spline ends.
  - i. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.

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- m. Unheaded Anchor Rods: ASTM F 1554, Grade 36.
    - i. Configuration: Straight.
    - ii. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
    - iii. Plate Washers: ASTM A 36/A 36M carbon steel.
    - iv. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
    - v. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
  - n. Headed Anchor Rods: ASTM F 1554, Grade 36.
    - i. Configuration: Straight.
    - ii. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
    - iii. Plate Washers: ASTM A 36/A 36M carbon steel.
    - iv. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
    - v. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
  - o. Threaded Rods: ASTM A 307, Grade A.
    - i. Nuts: ASTM A 563 (ASTM A 563M).
    - ii. Washers: ASTM F 436 carbon steel.
    - iii. Finish: Hot-dip zinc coating, ASTM A 153/A 153M, Class C.
- (7) Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
- a. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil (0.025 mm).
    - i. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil (0.013 mm) on each side.
  - b. Prime galvanized members with specified primer after phosphoric acid pretreatment.
  - c. Primer: SSPC-Paint 15, Type I, red oxide.

E. METAL ROOF PANELS

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- (1) Vertical-Rib, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
  - a. Material: Zinc-coated steel sheet, 24 gauge nominal thickness, embossed texture.
    - i. Exterior Finish: Siliconized polyester.
    - ii. Color: As selected by Architect from manufacturer's full range.
  - b. Clips: Manufacturer's standard, fixed type or floating type to accommodate thermal movement; fabricated from zinc-coated steel sheet.
  - c. Joint Type: Panels snapped together.
  - d. Joint Type: Mechanically seamed, folded according to manufacturer's standard.
  - e. Panel Coverage: 16 inches.
  - f. Panel Height: 2 inches.
  - g. Uplift Rating: UL 90.
- (2) Tapered-Rib-Profile, Metal Liner Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
  - a. Material: Zinc-coated steel sheet, 26 gauge nominal thickness.
    - i. Exterior Finish: Siliconized polyester.
    - ii. Color: As selected by Architect from manufacturer's full range.
  - b. Major-Rib Spacing: 6 inches or 12 inches o.c.
  - c. Panel Coverage: 36 inches.
  - d. Panel Height: 1.25 inches or 1.5 inches.

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(3) Materials:

- a. Metallic-Coated Steel Sheet: Restricted-flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
  - i. Zinc-Coated Steel Sheet: ASTM A 653/ A 653M, G90 coating designation; structural quality.
  - ii. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/ A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
  - iii. Surface: Smooth, flat finish.

(4) Finishes:

- a. Exposed Coil-Coated Finish:
  - i. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.
- b. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

F. METAL WALL PANELS

- (1) Tapered-Rib-Profile, Exposed-Fastener Metal Wall Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.
  - a. Material: Zinc-coated steel sheet, 22 gauge nominal thickness.
    - i. Exterior Finish: Siliconized polyester.
    - ii. Color: As selected by Architect from manufacturer's full range.
  - b. Major-Rib Spacing: 7.2 inches o.c.
  - c. Panel Coverage: 36 inches.

d. Panel Height: 1.25 inches or 1.5 inches.

(2) Materials:

- a. Metallic-Coated Steel Sheet: Restricted-flatness steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
  - i. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality.
  - ii. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.
  - iii. Surface: Smooth, flat finish.

(3) Finishes:

- a. Exposed Coil-Coated Finish:
  - i. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.
- b. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

G. THERMAL INSULATION

- (1) Faced Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. (8-kg/cu. m) density; 2-inch- (51-mm-) wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
- (2) Unfaced Metal Building Insulation: ASTM C 991, Type I, or NAIMA 202, glass-fiber-blanket insulation; 0.5-lb/cu. ft. (8-kg/cu. m) density; 2-inch- (51-mm-) wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
  - a. Vapor-Retarder Facing: ASTM C 1136, with permeance not greater than 0.02 perm (1.15 ng/Pa x s x sq. m) when tested according to ASTM E 96/E 96M, Desiccant Method.



true to line and levels indicated, with exposed edges folded back to form hems.

- (2) Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
- a. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
  - b. Clips: Manufacturer's standard, formed from steel sheet, designed to withstand negative-load requirements.
  - c. Cleats: Manufacturer's standard, mechanically seamed cleats formed from steel sheet.
  - d. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  - e. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
  - f. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch (25-mm) standoff; fabricated from extruded polystyrene.
- (3) Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
- a. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
  - b. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

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- c. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- (4) Flashing and Trim: Formed from 26 gauge nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.
- a. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
  - b. Opening Trim: Formed from 22 gauge nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.
- (5) Gutters: Formed from 22 gauge nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
- a. Gutter Supports: Fabricated from same material and finish as gutters as required for snow conditions.
  - b. Strainers: Bronze, copper, or aluminum wire ball type at outlets.
- (6) Downspouts: Formed from 24 gauge nominal-thickness, zinc-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot long sections, complete with formed elbows and offsets.
- a. Mounting Straps: Fabricated from same material and finish as gutters.

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- (7) Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.
- (8) Materials:
  - a. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
    - i. Fasteners for Metal Roof Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM sealing washer.
    - ii. Fasteners for Metal Roof Panels: Self-drilling, Type 410 stainless-steel or self-tapping, Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM washer under heads of fasteners bearing on weather side of metal panels.
    - iii. Fasteners for Metal Wall Panels: Self-drilling, Type 410 stainless-steel or self-tapping, Type 304 stainless-steel or zinc-alloy-steel hex washer head, with EPDM sealing washers bearing on weather side of metal panels.
    - iv. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
    - v. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
  - b. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
  - c. 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.
  - d. Metal Panel Sealants:
    - i. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.

- ii. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

## I. FABRICATION

- (1) General: Design components and field connections required for erection to permit easy assembly.
  - a. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
  - b. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.
- (2) Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.
- (3) Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
  - a. Make shop connections by welding or by using high-strength bolts.
  - b. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
  - c. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
  - d. Weld clips to frames for attaching secondary framing.
  - e. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.
- (4) Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for

erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

- a. Make shop connections by welding or by using non-high-strength bolts.
- b. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

(5) Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

- a. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

#### 4. EXECUTION

##### A. EXAMINATION

- (1) Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- (2) Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
  - a. Engage land surveyor to perform surveying.
- (3) Proceed with erection only after unsatisfactory conditions have been corrected.

##### B. PREPARATION

- (1) Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- (2) Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to

design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

### C. ERECTION OF STRUCTURAL FRAMING

- (1) Erect metal building system according to manufacturer's written erection instructions and erection drawings.
- (2) Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.
- (3) Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- (4) Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - a. Set plates for structural members on wedges, shims, or setting nuts as required.
  - b. 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 plate before packing with grout.
  - c. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- (5) Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - a. Level and plumb individual members of structure.
  - b. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

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- (6) Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
  - a. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for bolt type and joint type specified.
    - i. Joint Type: Snug tightened or pretensioned.
- (7) Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
  - a. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
  - b. Locate and space wall girts to suit openings such as doors and windows.
  - c. Locate canopy framing as indicated.
  - d. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- (8) Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
  - a. Tighten rod and cable bracing to avoid sag.
  - b. Locate interior end-bay bracing only where indicated.
- (9) Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- (10) Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

D. METAL PANEL INSTALLATION, GENERAL

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- (1) Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
  - a. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.
- (2) General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - a. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
    - i. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
  - b. Install metal panels perpendicular to structural supports unless otherwise indicated.
  - c. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
  - d. Locate and space fastenings in uniform vertical and horizontal alignment.
  - e. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment.
  - f. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- (3) Lap-Seam Metal Panels: Install screw fasteners using power tools with controlled torque adjusted to compress EPDM washers tightly without damage to washers, screw threads, or metal panels. Install screws in predrilled holes.
  - a. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.

- (4) Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
- (5) Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
  - a. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
  - b. Prepare joints and apply sealants to comply with requirements in Section 07901 "Caulking and Sealants."

E. METAL ROOF PANEL INSTALLATION

- (1) General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
  - a. Install hip caps as metal roof panel work proceeds.
  - b. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- (2) Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
  - a. Install clips to supports with self-drilling or self-tapping fasteners.
  - b. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  - c. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.

- d. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
  - e. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
  - f. Provide metal closures at peaks, rake edges, rake walls, and each side of ridge and hip caps.
- (3) Metal Fascia Panels: Align bottom of metal panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws. Flash and seal metal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.
- (4) Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

#### F. METAL WALL PANEL INSTALLATION

- (1) General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
- a. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
  - b. Shim or otherwise plumb substrates receiving metal wall panels.
  - c. When two rows of metal panels are required, lap panels 4 inches (102 mm) minimum.
  - d. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
  - e. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.

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- f. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
  - g. Install screw fasteners in predrilled holes.
  - h. Install flashing and trim as metal wall panel work proceeds.
  - i. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated; or, if not indicated, as necessary for waterproofing.
  - j. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
  - k. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- (2) Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.
- (3) Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), nonaccumulative, on level, plumb, and on location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and

G. THERMAL INSULATION INSTALLATION

- (1) General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
- a. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
  - b. Tape joints and ruptures in vapor retarder and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.
  - c. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.
  - d. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation, with both sets of facing tabs sealed, to provide a complete vapor retarder.

- (2) Blanket Roof Insulation: Comply with the following installation method:
  - a. Two Layers between Purlin with Spacer Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
    - i. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
  - b. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
- (3) Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.
  - a. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
  - b. Sound-Absorption Insulation: Where sound-absorption requirement is indicated for metal liner panels, cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.
- (4) Board Wall Insulation: Extend board insulation in thickness indicated to cover entire wall. Hold in place by metal wall panels fastened to secondary framing. Comply with manufacturers' written instructions.
  - a. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

#### H. ACCESSORY INSTALLATION

- (1) General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
  - a. Install components required for a complete metal roof panel

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- assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
- b. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
  - c. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.
- (2) Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
- a. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
  - b. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- (3) Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- (4) Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at

approximately 60 inches o.c. in between.

- a. Provide elbows at base of downspouts to direct water away from building.
- (5) Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.
  - (6) Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

#### I. FIELD QUALITY CONTROL

- (1) Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  - a. Steel construction.
- (2) Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- (3) Tests and Inspections:
  - a. High-Strength, Field-Bolted Connections: Connections shall be tested and inspected during installation according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- (4) Product will be considered defective if it does not pass tests and inspections.
- (5) Prepare test and inspection reports.

#### J. CLEANING AND PROTECTION

- (1) Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- (2) Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.
- (3) Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
  - a. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."

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- b. Apply a compatible primer of same type as shop primer used on adjacent surfaces.
- (4) Touchup Painting: Cleaning and touchup painting are specified in Section 09900 "Painting".
- (5) Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- a. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION  
END OF DIVISION

## **DIVISION 26 - ELECTRICAL**

### **260500 COMMON WORK RESULTS FOR ELECTRICAL**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. Section Includes:
  - 1. Electrical equipment coordination and installation.
  - 2. Sleeves for raceways and cables.
  - 3. Sleeve seals.
  - 4. Grout.
  - 5. Common electrical installation requirements.

##### **1.3 DEFINITIONS**

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.

##### **1.4 SUBMITTALS**

- A. Product Data: For sleeve seals.

##### **1.5 COORDINATION**

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  - 3. To allow right of way for piping and conduit installed at required slope.
  - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

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- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

## PART 2 - PRODUCTS

### 2.1 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
  - 1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

### 2.2 SLEEVE SEALS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.

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- c. Metraflex Co.
  - d. Pipeline Seal and Insulator, Inc.
2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  3. Pressure Plates: Carbon steel. Include two for each sealing element.
  4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## 2.3 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.

## PART 3 - EXECUTION

### 3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

### 3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

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- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Extend sleeves to unistrut support on both surfaces of walls.
- F. Extend sleeves installed in floors 4" (inches) (50 mm) above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable, unless indicated otherwise.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
  - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants."
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."
- K. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

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3.3 SLEEVE-SEAL INSTALLATION

- A. Install to seal exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.4 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

END OF SECTION

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## **260519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Contract Forms, Conditions of the Contract, Construction Manager at Risk (CMR) Agreement including Supplemental General Conditions and Exhibits, and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.
  - 3. Sleeves and sleeve seals for cables.

#### **1.3 DEFINITIONS**

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

#### **1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

#### **1.5 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

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1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.
- D. Electrical Components, Devices, and Accessories: Listed and Labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 COORDINATION

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Alcan Products Corporation; Alcan Cable Division.
  2. American Insulated Wire Corp.; a Leviton Company.
  3. General Cable Corporation.
  4. Southwire Company.
- B. Conductors: Comply with NEMA WC 70.
  1. All wire is to be new and brought to the job site in unopened packages.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN, XHHW-2.

## 2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
  2. Hubbell Power Systems, Inc.
  3. O-Z/Gedney; EGS Electrical Group LLC.
  4. 3M; Electrical Products Division.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

## 2.3 SLEEVES FOR CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

## 2.4 SLEEVE SEALS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Advance Products & Systems, Inc.
  2. Calpico, Inc.
  3. Metraflex Co.
  4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

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2. Pressure Plates: Stainless steel. Include two for each sealing element.
3. Connecting Bolts and Nuts: Stainless steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## PART 3 - EXECUTION

### 3.1 CONDUCTOR MATERIAL APPLICATIONS

#### A. Feeders:

1. Conductors shall be copper and shall be stranded for No. 12 AWG and larger.
2. Conductor insulation shall be rated for 600V minimum unless noted otherwise.
3. Aluminum cables are acceptable only where specified on drawings.

#### B. Branch Circuits:

1. Conductors shall be copper and shall be stranded for No. 12 AWG and larger.
2. Conductor insulation shall be rated for 600V minimum unless noted otherwise.
3. MC cable acceptable, downstream of homerun junction boxes. MC cable shall have proper color coding for phases and system voltages.

### 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-THWN single conductors (for sizes #12 and #4 AWG) in raceway. Type XHHW-2, single conductors in raceway for all sizes #2 and larger (Do not use #3 AWG).
- B. Exposed Feeders: Type THHN-THWN single conductors (for sizes #12 and #4 AWG) in raceway. Type XHHW-2, single conductors in raceway for all sizes #2 and larger (Do not use #3 AWG).
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN single conductors (for sizes #12 and #4 AWG) in raceway. Type XHHW-2, single conductors in raceway for all sizes #2 and larger (Do not use #3 AWG).
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway for all sizes

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- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN single conductors (for sizes #12 and #4 AWG) in raceway. Type XHHW-2, single conductors in raceway for all sizes #2 and larger (Do not use #3 AWG).
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN single conductors (for sizes #12 and #4 AWG) in raceway. Type XHHW-2, single conductors in raceway for all sizes #2 and larger (Do not use #3 AWG).
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW single conductors (for sizes #12 and #4 AWG) in raceway. Type XHHW-2, single conductors in raceway for all sizes #2 and larger (Do not use #3 AWG).
- H. Branch Circuits Installed below Raised Flooring: Type THHN-THWN single conductors (for sizes #12 and #4 AWG) in raceway. Type XHHW-2, single conductors in raceway for all sizes #2 and larger (Do not use #3 AWG).
- I. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application. Provide coiled pre-formed retractable cables in food service areas as indicated.
- J. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- K. Class 2 Control Circuits: Type THHN-THWN, in raceway.

### 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. All wiring shall be minimum #12 AWG stranded copper conductors. Only exception is for fire alarm circuits where #14 AWG solid copper conductors shall be used.
- B. Control cabling for instrumentation shall be twisted shielded pair No. 18 ga. Minimum copper conductors with overall foil shield where used for 4 to 20 mA or 1 to 10 volt control signals. Use #14 AWG stranded copper for 120 volt control signals.
- C. Wiring of different system voltages shall be in separate raceways or separated gutter compartments. Do not combine systems of various voltages or circuits from separate sources in the same conduit system. The following exceptions apply:
  - 1. Readily identifiable low voltage conductors for lighting system control may be run in the same conduit as the power conductors for a terminal drop to a light switch or to a single light fixture.

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2. Motor control wires (not including control wiring for a VFD) may be installed in the same conduit as the power wiring if they can be installed without damaging the smaller conductors.
- D. Conduit installations, for new installations, shall be limited to three circuits maximum. Where more than one 20A circuit is installed in a conduit with a common neutral, size the neutral conductor to be #10AWG minimum.
- E. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- F. Conduit systems shall be complete prior to pulling wires. Any conduit run which does not permit conductors to be pulled in readily shall be condemned and replaced to the satisfaction of the Engineer.
- G. Use manufacturer UL approved pulling compound or lubricant where necessary. The compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- H. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway. Protect conductors at all locations where exiting from conduits.
  1. When pulling in cables for feeders use power operated pulling equipment only where specifically approved by Engineer.
  2. Do not use tape to cable wires for pulling into conduits.
- I. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- J. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- K. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."
  1. Wire shall be color coded throughout its entire length.
  2. Grounding and grounded conductors are to be identified at all visible points.
- L. When calculating box fill, maximum fill shall be 70% of NEC requirements to allow for future wiring.
- M. Power and lighting conduits shall contain a ground conductor sized per NEC 250-122.

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- N. Carefully cable all wires in panelboards, gutters and wireways. Use tie wraps where needed. Do not use tape for cabling in panels, gutters, or wireways.

### 3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
  - 1. Use oxide inhibitor and crimp type connectors in each splice and tap conductor for aluminum conductors.
- C. For wire sizes #6 AWG and smaller as appropriate for devices, wiring may be connected using wire nut type of wiring connectors. Twist wires together before applying wire nut. Interior of nuts shall be metallic. Submit samples for approval.
- D. Joints in cables larger than #6 AWG shall be made with solderless connectors. Either compression type connectors or split bolt connectors and a combination of rubber and plastic "Scotch 33" type of tape shall be used.
- E. Wiring at Outlets: Install conductor at each outlet, with at least 8 inches (203 mm) of slack.
- F. Connections at terminal strips shall be made using either compression type of terminals or a ring or spade connector must be installed on the wire before connecting to a screw terminal. Wrapping stranded wire at a screw terminal is not permitted.
- G. Suitcase type connectors are not approved for use on this project.

### 3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

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- D. Rectangular Sleeve Minimum Metal Thickness:
  - 1. For sleeve rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
  - 2. For sleeve rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both wall surfaces.
- G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and cable unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to Division 07 Section "Joint Sealants."
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with firestop materials according to Division 07 Section "Penetration Firestopping."
- L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.
- M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between cable and sleeve for installing mechanical sleeve seals.

### 3.6 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground exterior-wall penetrations.

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- B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 Section "Penetration Firestopping."

### 3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections and prepare test reports.
- C. Tests and Inspections:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
  - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each termination in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so termination are accessible to portable scanner.
    - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- D. Test Reports: Prepare a written report to record the following:

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1. Test procedures used.
  2. Test results that comply with requirements.
  3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- E. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION

## **260526 GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings Contract Forms, Conditions of the Contract, Construction Manager at Risk (CMR) Agreement including Supplemental General Conditions and Exhibits, and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:
  - 1. Underground distribution grounding.
  - 2. Common ground bonding with lightning protection system.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
  - 1. Test wells.
  - 2. Ground rods.
  - 3. Ground rings.
  - 4. Grounding arrangements and connections for separately derived systems.
- C. Qualification Data: For testing agency and testing agency's field supervisor.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
  - 1. Instructions for periodic testing and inspection of grounding features at test wells ground rings and grounding connections for separately derived systems based on NFPA 70B.
    - a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
    - b. Include recommended testing intervals.

## 1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

## PART 2 - PRODUCTS

### 2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, **1/4 inch(6 mm)** in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; **1-5/8 inches(41 mm)** wide and **1/16 inch(1.6 mm)** thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; **1-5/8 inches(41 mm)** wide and **1/16 inch(1.6 mm)** thick.
- C. Bare Grounding Conductor and Conductor Protector for Wood Poles:
  - 1. No. 4 AWG minimum, soft-drawn copper.
  - 2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir or cypress or cedar.
- D. Grounding Bus: Rectangular bars of annealed copper, **1/4" by 2 inches(6 by 50 mm)** in cross section, unless otherwise indicated; with insulators.

## 2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
  - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

## 2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel; **3/4 inch by 10 feet (19 mm by 3 m)** in diameter.

## PART 3 - EXECUTION

### 3.1 APPLICATIONS

- A. Conductors: Install stranded conductors for No. 12 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.
  - 1. Bury at least **24 inches (600 mm)** below grade.
  - 2. Duct-Bank Grounding Conductor: Bury **12 inches (300 mm)** above duct bank when indicated as part of duct-bank installation.
  - 3. Provide a minimum 50' size 3/0 stranded bare copper conductor in the footing to provide for a base conductor or Concrete Encased Electrode (UFER) ground for the electrical system. At each end bond out to a 3/4" x 10' copper clad or copper weld ground rod. Provide an inspection or test point at each ground rod.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
  - 1. Install bus on insulated spacers **1 inch (25 mm)**, minimum, from wall **6 inches (150 mm)** above finished floor, unless otherwise indicated.

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2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.

E. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

### 3.2 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so **4 inches (100 mm)** will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from **2 inches (50 mm)** above to **6 inches (150 mm)** below concrete. Seal floor opening with waterproof, non-shrink grout.
- C. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.
- D. Pad-Mounted Transformers and Switches: Install two ground rods and ground ring around the pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Install tinned-copper conductor not less than No. 2 AWG for ground ring and for taps to equipment grounding terminals. Bury ground ring not less than **6 inches (150 mm)** from the foundation.

### 3.3 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.

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- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
  - 1. Feeders and branch circuits.
  - 2. Lighting circuits.
  - 3. Receptacle circuits.
  - 4. Single-phase motor and appliance branch circuits.
  - 5. Three-phase motor and appliance branch circuits.
  - 6. Flexible raceway runs.
  - 7. Armored and metal-clad cable runs.
  - 8. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
  
- C. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
  
- D. Water Heater and Heat-Tracing, and Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
  
- E. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
  - 1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a **1/4-by-2-by-12-inch (6-by-50-by-300-mm)** grounding bus.
  - 2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
  
- F. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

### 3.4 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
  
- B. Common Ground Bonding with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system

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grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.

- C. Ground Rods: Drive rods until tops are **2 inches (50 mm)** below finished floor or final grade, unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
  - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
  
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Division 26 Section "Underground Ducts and Raceways for Electrical Systems," and shall be at least **12 inches(300 mm)** deep, with cover.
  - 1. Test Wells: Install at least one test well for each service, unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
  
- E. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.
  
- F. Grounding and Bonding for Piping:
  - 1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
  - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
  - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

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- G. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.
- H. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than **60 feet (18 m)** apart.
- I. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each indicated item, extending around the perimeter of building.
  - 1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.
  - 2. Bury ground ring not less than **24 inches (600 mm)** from building foundation.
- J. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, using a minimum of **20 feet (6 m)** of bare copper conductor not smaller than No. 4 AWG.
  - 1. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to grounding electrode external to concrete.

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- C. Perform the following tests and inspections and prepare test reports:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
    - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method according to IEEE 81.
  - 3. Prepare dimensioned drawings locating each test well, ground rod and ground rod assembly, and other grounding electrodes. Identify each by

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letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

- D. Report measured ground resistances that exceed the following values:
1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
  2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
  3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
  4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
  5. Substations and Pad-Mounted Equipment: 5 ohms.
  6. Manhole Grounds: 10 ohms.
- E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

## **260529 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Contract Forms, Conditions of the Contract, Construction Manager at Risk (CMR) Agreement including Supplemental General Conditions and Exhibits, and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Hangers and supports for electrical equipment and systems.
- B. Related Sections include the following:
  - 1. Division 26 Section 26 05 48 "Vibration And Seismic Controls For Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

#### **1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

#### **1.4 PERFORMANCE REQUIREMENTS**

- A. All materials shall be corrosion resistant (supports, fasteners, miscellaneous hardware).
- B. Minimum support requirements shall be as specified in the NEC for electrical equipment. Where specified herein as more stringent the more stringent shall apply.
- C. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

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- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.5 SUBMITTALS

- A. Product Data: For the following:
  - 1. Steel slotted support systems.
  - 2. Nonmetallic slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
  - 1. Trapeze hangers. Include Product Data for components.
  - 2. Steel slotted channel systems. Include Product Data for components.
  - 3. Nonmetallic slotted channel systems. Include Product Data for components.
  - 4. Equipment supports.
- C. Welding certificates.

1.6 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.
- C. Electrical Components, Devices, and Accessories: Listed and Labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

## PART 2 - PRODUCTS

### 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation.
    - f. Unistrut; Tyco International, Ltd.
    - g. Wesanco, Inc.
  2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA 4.
  5. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout

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capacities appropriate for supported loads and building materials where used.

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1) Hilti Inc.
  - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
  - 3) MKT Fastening, LLC.
  - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened Portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
  - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
    - 2) Empire Tool and Manufacturing Co., Inc.
    - 3) Hilti Inc.
    - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
    - 5) MKT Fastening, LLC.
  3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
  4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
  5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
  6. Toggle Bolts: All-steel springhead type.
  7. Hanger Rods: Threaded steel.

## 2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 05 Section "Metal Fabrications" for steel shapes and plates.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

1. CONDUIT SUPPORTS shall be as follows:
  - a. Width of structural strut trapeze shall not exceed 12".
  - b. Where individual conduits are run on walls and where appropriate one-hole straps may be used. Where more than two conduits are run in parallel or where conduits are 1 ½" or larger, support using approved structural strut members fastened to the structure at minimum of two points. Minimum strut length is 12 inches.
  - c. Single conduits trapeze above ceiling use ¼" all thread and conduit hangers up to 1 ½". For 2" and above use strut rack and minimum of 2-3/8" or larger all thread rods.
  - d. Wire shall not be used as a method to fasten conduits above ceilings. Conduit hangers or straps as appropriate shall be used to rigidly support the conduits in each situation. 18 gauge or larger galvanized tie wire may be used to tie conduits inside of metal stud walls.
  - e. Conduits above drop ceilings shall be supported independent of wire supports for drop ceilings, and shall not be supported on wires. Caddy #812MB18 box and conduit supports or equal may be used.
  - f. Fixture whips, however, shall be permitted to be supported by the fixtures seismic wire utilizing approved clips.
  - g. All fasteners shall be steel threaded inserts or steel expansion shield anchors for location used. One hole straps shall be either connected to the wall studs using appropriate screws or to the wall using expansion bolts. In hollow masonry walls steel toggle bolts may be used. Plastic or lead expansion anchors shall not be used. No powder actuated fasteners shall be used. All fasteners shall be screw in type fasteners.
  - h. Sheet rock screws of any type shall not be used.
  - i. Fastening methods shall be subject to approval by Owner representative.
  - j. One hole conduit straps shall be Mineralac Med series or equal.
2. LIGHT FIXTURE SUPPORTS in drop ceilings
  - a. Small incandescent or down lights to have one support wire.
  - b. 2 x 2 or 2 x 4 fluorescent to have (2) support wires and earthquake clips.
  - c. Support wires to be not less than 12 gauge galvanized steel.

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- d. Deflection on support wires to be not more than 30% except where approved by Owner.
  - e. All support wire connected to structure.
  - f. Anchors in concrete to be not less than 1/4" diameter. Use only drill in type anchors.
  - g. All other fixtures shall be rigidly supported from the structure.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its' Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
- 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- 1. CONDUITS
    - a. Support on 10' centers and within 18" of boxes connector, couplings or equipment.
    - b. Support from structure.
    - c. Use strut frame or angle iron frame when no wall system is available.
  - 2. LIGHT FIXTURES
    - a. Support from structure.
    - b. Support independent of ceiling grid.
    - c. Earthquake clips.
    - d. Support from structure to a 500% safety factor.
  - 3. SAFETY SWITCHES, MOTOR STARTERS, PANELBOARDS
    - a. Use strut backing when more than 1 is surface mounted in an area.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

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- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
  - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
  - 7. To Light Steel: Sheet metal screws.
  - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### 3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Division 05 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

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3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touchup: Comply with requirements in Division 09 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

## **260533 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Contract Forms, Conditions of the Contract, Construction Manager at Risk (CMR) Agreement including Supplemental General Conditions and Exhibits, and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
  - 1. Division 26 Section 26 05 43 "Underground Ducts and Raceways for Electrical Systems"

#### **1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. FMC: Flexible metal conduit.
- D. GRC: Galvanized rigid steel.
- E. LFMC: Liquid-tight flexible metal conduit.
- F. RNC: Rigid nonmetallic conduit.

#### **1.4 SUBMITTALS**

- A. Product Data: For conduit surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Custom enclosures and cabinets.
  - 2. For handholes and boxes for underground wiring, including the following:

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- a. Duct entry provisions, including locations and duct sizes.
  - b. Frame and cover design.
  - c. Grounding details.
  - d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
  - e. Joint details.
- C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
1. Structural members in the paths of conduit groups with common supports.
  2. Fire Protection, HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.

## 1.5 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

## PART 2 - PRODUCTS

### 2.1 METAL CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
  2. Alflex Inc.
  3. Allied Tube & Conduit; a Tyco International Ltd. Co.
  4. Anamet Electrical, Inc.; Anaconda Metal Hose.
  5. Electri-Flex Co.
  6. Manhattan/CDT/Cole-Flex.
  7. Maverick Tube Corporation.
  8. O-Z Gedney; a unit of General Signal.
  9. Wheatland Tube Company.
- B. Galvanized Rigid Steel Conduit (GRC): ANSI C80.1.
1. No running threads.
  2. Use one piece couplings.
  3. Use Ericsons only where approved by engineer.

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4. Double locknuts and threaded insulated steel bushings at all boxes.
  5. Minimum  $\frac{3}{4}$ " and minimum 1" for telecommunications
  6. No Condulet type fittings over  $1\frac{1}{2}$ ".
  7. Use within 5' of building walls, if penetrating the structure, in underground runs.
  8. All indoor runs larger than 4" except communications or special systems.
  9. Underground or in concrete must be half lap wrapped with 10 mil PVC tape or painted with bitumastic compound.
  10. Use in tunnel.
  11. Use at a height of 4' and below in all Electrical, Equipment and Mechanical Rooms or where subject to physical damage.
- C. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
1. Comply with NEMA RN 1.
  2. Coating Thickness: 0.040 inch (1 mm), minimum.
- D. EMT: ANSI C80.3.
1. Use steel compression type fittings, and couplings.
  2. Connectors shall have insulated throat.
  3. No factory emt bends allowed below 1".
  4. No Condulet type fittings over  $1\frac{1}{2}$ ".
  5. Minimum  $\frac{3}{4}$ " homeruns and  $\frac{1}{2}$ " allowed for branch circuits.
- E. FMC: Zinc-coated steel
1. Minimum size  $\frac{3}{8}$ " with #14 THHN wire. For use only with a connection to an individual light fixture or with a single circuit.
  2. No pre-wired raceways.
  3. 1 screw compression or set screw connectors only.
  4. Maximum 6' length.
  5. No Aluminum flex.
  6. No BX cable.
  7. No MC cable unless approved by Electrical Engineer.
  8. Use integral insulated throat fittings.
  9. Use only where permitted by Engineer or for feed to lights or smoke detectors in a t-bar ceiling.
  10. Provide sufficient length for loop at bottom of flex. (Do not draw tight).
- F. LFMC: Flexible steel conduit with PVC jacket.
1. Equal to Sealtight.
  2. Minimum size  $\frac{1}{2}$ ". (For connection to a single motor or device with less than 5#12).
  3. Use insulated throat compression type steel connectors.
  4. Maximum length 6', minimum length 2'.

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5. All device wiring shall be field wired by the electrical contractor. Suitcase type connectors shall not be used.
  6. Use only where permitted by Engineer.
  7. Use for Final connection to all equipment.
  8. It shall not be used to penetrate sheet metal enclosures.
  9. Provide sufficient length for loop at bottom of flex. (Do not draw tight).
- G. Fittings for Conduit (Including all Types and Flexible and Liquid-tight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
  2. Fittings for EMT: Steel, compression type.
  3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- H. Joint Compound for Rigid Steel Conduit: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

## 2.2 NONMETALLIC CONDUIT

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
  2. Anamet Electrical, Inc.; Anaconda Metal Hose.
  3. Arnco Corporation.
  4. CANTEX Inc.
  5. CertainTeed Corp.; Pipe & Plastics Group.
  6. Condux International, Inc.
  7. ElecSYS, Inc.
  8. Electri-Flex Co.
  9. Lamson & Sessions; Carlon Electrical Products.
  10. Manhattan/CDT/Cole-Flex.
  11. RACO; a Hubbell Company.
  12. Thomas & Betts Corporation.
- B. ENT: Use not permitted.
- C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
1. Schedule 40 minimum wall thickness.
  2. Minimum size  $\frac{3}{4}$ ".
  3. Use only below grade or in light pole foundations.

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4. Use only with approved PVC supports.
5. Use inside of block walls, with solid grouted cells.
6. May be used as a sleeve inside of building for grounding protection wiring.
7. All bends and offsets shall be in rigid steel (GRC) elbows.
8. All stub ups shall be GRC.
9. Do not expose in plenum spaces.

D. LFNC: UL 1660.

E. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

F. Fittings for LFNC: UL 514B.

1. .

G. Description: Comply with UL 2024; flexible type, approved for plenum riser installation.

### 2.3 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 12, unless otherwise indicated.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Wireway Covers: Hinged covers only.

E. Finish: Manufacturer's standard enamel finish.

### 2.4 BOXES, ENCLOSURES, AND CABINETS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
2. EGS/Appleton Electric.
3. Erickson Electrical Equipment Company.

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4. Hoffman.
  5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
  6. O-Z/Gedney; a unit of General Signal.
  7. RACO; a Hubbell Company.
  8. Robroy Industries, Inc.; Enclosure Division.
  9. Scott Fetzer Co.; Adalet Division.
  10. Spring City Electrical Manufacturing Company.
  11. Thomas & Betts Corporation.
  12. Walker Systems, Inc.; Wiremold Company (The).
  13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Sand-Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover. "Bell" style pot metal boxes shall not be used.
1. DEVICE BOXES
    - a. Minimum size to be 4"sq. x 2 1/8" deep with adequate space for devices, wires, and 30% spare fill capacity except as approved by Owner.
    - b. Minimum size for telecommunications shall be 4-11/16"sq. x 2 1/8" deep.
    - c. Shall be galvanized steel one piece boxes. No more than one plaster ring shall be utilized with each box. Gangable boxes or handy boxes shall not be used without prior approval of the engineer.
  2. JUNCTION BOXES
    - a. Minimum size 4 11/16" sq. x 2 1/8" with 1/2" and 3/4" knockouts on each side. For conduits 1" and larger use boxes 6 x CS (conduit size) X 8 x CS, X 4" minimum or as per NEC 370-28. Provide for 30% spare fill capacity in all junction boxes. Extension boxes are not permitted.
    - b. Shall be galvanized steel or metal with baked enamel. Where used outdoor boxes shall be NEMA 3R rated. Where subject to corrosion shall be NEMA 4X SS.
    - c. All home runs shall have a j-box located in an accessible location above the ceilings (in interstitial ceiling spaces).
    - d. Ground tails shall be installed in boxes prior to rough-in.
- D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- E. Metal Floor Boxes: Cast or sheet metal, fully adjustable, rectangular, as specified.

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1. Use cast iron boxes for slab on grade applications.
  2. Use sheet metal boxes for in-deck applications.
- F. Nonmetallic Floor Boxes: Nonadjustable, round.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
- I. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
- J. Cabinets:
1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  2. Hinged door in front cover with flush latch and concealed hinge.
  3. Key latch to match panelboards.
  4. Metal barriers to separate wiring of different systems and voltage.
  5. Accessory feet where required for freestanding equipment.

## 2.5 SLEEVES FOR RACEWAYS

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."

## 2.6 SLEEVE SEALS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Advance Products & Systems, Inc.
  2. Calpico, Inc.
  3. Metraflex Co.
  4. Pipeline Seal and Insulator, Inc.

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- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 2. Pressure Plates: Stainless steel. Include two for each sealing element.
  - 3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### PART 3 - EXECUTION

#### 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
  - 1. Exposed Conduit: Galvanized Rigid steel conduit.
  - 2. Concealed Conduit, Aboveground: EMT.
  - 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried. Use galvanized rigid steel conduit for all bends and offsets in underground runs.
  - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
  - 6. Application of Handholes and Boxes for Underground Wiring:
    - a. Handholes and Pull Boxes in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Non-deliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
    - b. Handholes and Pull Boxes in Sidewalk and Similar Applications with a Safety Factor for Non-deliberate Loading by Vehicles: Polymer-concrete units, SCTE 77, Tier 8 structural load rating.
    - c. Handholes and Pull Boxes Subject to Light-Duty Pedestrian Traffic Only: Polymer-concrete units, structurally tested according to SCTE 77 with 3000-lbf (13 345-N) vertical loading.
- B. Comply with the following indoor applications, unless otherwise indicated:
  - 1. Exposed, Not Subject to Physical Damage: EMT.
  - 2. Exposed and Subject to Severe Physical Damage: Galvanized Rigid steel conduit.
    - a. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

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- b. Mechanical rooms.
  - 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  - 5. Damp or Wet Locations: Galvanized Rigid steel conduit.
  - 6. Boxes and Enclosures: NEMA 250, Type 1.
- C. Minimum Raceway Size:
  - 1. 3/4-inch (21-mm) trade size, for all home runs.
  - 2. 1/2" (16 mm) trade size allowed for branch circuits.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
  - 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
  - 2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.

### 3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

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1. Condulets shall not be used indoors in place of pull boxes.
  2. Route EMT not less than 12" above drop ceilings.
- H. Raceways Embedded in Slabs:
1. Run conduit larger than 1-inch (27-mm) trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
  3. Change from RNC, Type EPC-40-PVC to rigid steel conduit, before rising above the floor.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire.
- L. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
1. 1-Inch (25-mm) Trade Size and Larger: Install raceways in maximum lengths of 75 feet (23 m).
  2. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- M. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where otherwise required by NFPA 70.
- N. Flexible Conduit Connections: Use maximum of 72 inches (1830 mm) of flexible conduit for recessed and semi-recessed lighting fixtures, equipment

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subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
  2. Use LFMC in damp or wet locations not subject to severe physical damage.
- O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Use galvanized rigid steel conduit for all bends and offsets in block walls.
- P. Set metal floor boxes level and flush with finished floor surface.
- Q. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.
- R. Device boxes shall be installed to comply with the following:
1. No Madison clips used as supports.
  2. Rigidly support device boxes to structure independent of conduit system support.
  3. Flush mounted device boxes shall not have more than 1/8" gap.
  4. No back to back devices or boxes in walls unless approved. Offset all boxes in non-fire rated walls minimum of 6". For fire rated walls provide minimum 24" separation or use approved fire assembly.
  5. Where transitioning from flush mounted j-box to surface mounted raceway, horizontally mount the plastering so that the proper type of wall box connection may be utilized with the surface mounted raceway.
  6. Surface mounted boxes shall be 4" square boxes, with industrial raised device plates. These shall be only used in equipment rooms or where specifically approved by the U of A Electrical Engineer.
- S. All junction boxes shall be installed in compliance with the following:
1. Junction boxes shall be rigidly supported to structure independent of conduit system.
  2. Junction boxes shall be accessible.
  3. Runs between junction boxes shall not exceed 90'.
  4. Shall be identified per Section 26 05 53 (Identification for Electrical Systems).
  5. Shall not be located more than 3' or less than 1' above a drop ceiling.
  6. Covers shall be attached with machine screws only. NO self-tapping screws or wood screws shall be utilized in attaching the cover.
  7. Reference 26 05 29 (Hangers and Supports for Electrical Systems) for supports and anchors. No powder actuated, plastic or lead fasteners. Install boxes with machine screw type fasteners.
  8. Shall not have concentric knockouts unless specifically approved by the U of A Electrical Inspector or FDC Engineer.

9. Use grounding bushings on all enclosures having concentric and eccentric knockouts where such knockouts are approved by the University of Arizona Inspector.

### 3.3 INSTALLATION OF UNDERGROUND CONDUIT

#### A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 31 Section "Earth Moving" for pipe less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as specified in Division 31 Section "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 31 Section "Earth Moving."
4. Install rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Tape all underground galvanized rigid steel conduit with 10 mil PVC tape, half lapped or coated with a Bitumastic Compound.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor. Tape all underground galvanized rigid steel conduit with 10 mil PC coated with a Bitumastic compound.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
  - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

### 3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

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- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.
- D. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.
- E. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

### 3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 07 Section "Penetration Firestopping."
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
  - 1. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side greater than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
  - 2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches (1270 mm) and 1 or more sides equal to, or greater than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.
- G. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level.

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- H. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with Division 07 Section "Penetration Firestopping."
- L. Roof-Penetration Sleeves: Seal penetration of individual raceways with flexible, boot-type flashing units applied in coordination with roofing work.
- M. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

### 3.6 SLEEVE-SEAL INSTALLATION

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### 3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 07 Section "Penetration Firestopping."

### 3.8 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

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1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

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## **260553 IDENTIFICATION FOR ELECTRICAL SYSTEMS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Contract Forms, Conditions of the Contract, Construction Manager at Risk (CMR) Agreement including Supplemental General Conditions and Exhibits, and other Division 01 Specification Sections, apply to this Section.
- B. This Section includes the following:
  - 1. Identification for raceway and metal-clad cable.
  - 2. Identification for conductors and communication and control cable.
  - 3. Underground-line warning tape.
  - 4. Warning labels and signs.
  - 5. Equipment identification labels.
  - 6. Miscellaneous identification products.

#### **1.2 SUBMITTALS**

- A. Product Data: For each electrical identification product indicated.
- B. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.
- C. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.

#### **1.3 QUALITY ASSURANCE**

- A. Comply with ANSI A13.1 and ANSI C2.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.145.
- D. Electrical Components, Devices, and Accessories: Listed and Labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

#### 1.4 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in the Contract Documents, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual, and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

### PART 2 - PRODUCTS

#### 2.1 RACEWAY AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Color for Printed Legend:
  - 1. Power Circuits: Black letters on an orange field.
  - 2. Legend: Indicate system or service and voltage, if applicable.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches (50 mm) wide; compounded for outdoor use.

## 2.2 CONDUCTOR AND COMMUNICATION- AND CONTROL-CABLE IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
- B. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- C. Aluminum Wraparound Marker Labels: Cut from 0.014-inch- (0.35-mm-) thick aluminum sheet, with stamped, embossed, or scribed legend, and fitted with tabs and matching slots for permanently securing around wire or cable jacket or around groups of conductors.
- D. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch (50 by 50 by 1.3 mm), with stamped legend, punched for use with self-locking nylon tie fastener.
- E. Write-On Tags: Polyester tag, 0.015 inch (0.38 mm) thick, with corrosion-resistant grommet and polyester or nylon tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.

## 2.3 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment, unless otherwise indicated.
- C. Baked-Enamel Warning Signs: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 7 by 10 inches (180 by 250 mm).
- D. Metal-Backed, Butyrate Warning Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application. 1/4-inch (6.4-mm) grommets in corners for mounting. Nominal size, 10 by 14 inches (250 by 360 mm).
- E. Warning label and sign shall include, but are not limited to, the following legends:
  - 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."

2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

## 2.4 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
- B. Adhesive Marking Labels for Raceways: Provide pre-printed, flexible, self-adhesive labels with legend indicating voltage and service (Emergency, Lighting, Power, Light and Power, DC, Air Conditioning, Communications, Control, Fire Alarm.) Size: 1-1/8 inches high by 4 inches long for raceway 1-inch diameter and less, 1-1/8 inches high by 8 inches long for raceway over 1-inch diameter. Color: Black legend on orange background. Utilize in all equipment rooms and IDF closets.
- C. Pre-Tensioned Flexible Wrap-Around Colored Plastic Sleeves for Raceway Identification: Provide flexible acrylic bands sized to suit the raceway diameter and arranged to stay in place by pre-tensioned gripping action when coiled around the raceway or cable. Color: Black legend on orange background. Utilize in all equipment rooms and IDF closets.
- D. Wire/Cable Designation Tape Markers: Provide vinyl or vinyl cloth, self-adhesive wrap-around cable/conductor markers with pre-printed numbers and letters for designation purposes.
- E. Aluminum Wrap-Around Cable Marker Bands: Provide bands cut from 0.014-inch thick aluminum sheet and fitted with slots or ears for securing permanently around wire or cable jacket or around groups of conductors. Provide for legend application with stamped letters or numbers.
- F. Plasticized Card Stock Tags: Provide vinyl-cloth tags with pre-printed or machine printed legend to suit the application. Provide orange background, except as otherwise indicated and eyelet for fastener.
- G. Brass or Aluminum Tags: Provide metal tags with stamped legend, punched for fastener. Dimensions shall be 2 inches by 2 inches by 19-gauge.
- H. Engraved Plastic-Laminate Labels, Signs and Instruction Plates: Provide engraving stock melamine plastic laminate, 1/16-inch minimum thickness for up to 20 square inch sign or 8-inch length; 1/8-inch thickness for larger sizes. Engrave legend in white letters on black face and punch for mechanical fasteners.

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- I. Baked Enamel Warning and Caution Signs: Provide pre-printed aluminum signs suitable for indoor use with colors and legend appropriate to the location, punched for fasteners, and sized for good visibility.
- J. Metal Backed Butyrate Warning and Caution Signs: Provide weather resistant, non-fading pre-printed cellulose acetate butyrate signs with 20 gauge galvanized steel backing, with colors and legend appropriate to the location, and size selected for good visibility. Provide 1/4-inch grommets in corners for mounting.
- K. Fasteners for Plastic Laminate and Metal Signs: Provide self tapping stainless steel screws or No. 10/32 minimum stainless steel machine screws with nuts, and flat and lock washers.

## 2.5 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Cable Ties: Fungus-inert, self-extinguishing, 1-piece, self-locking, Type 6/6 nylon cable ties.
  - 1. Minimum Width: 3/16 inch (5 mm).
  - 2. Tensile Strength: 50 lb (22.6 kg), minimum.
  - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
  - 4. Color: Black, except where used for color-coding.
- B. Paint: Paint materials and application requirements are specified in Division 09 painting Sections.
  - 1. Exterior Concrete, Stucco, and Masonry (Other Than Concrete Unit Masonry):
    - a. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.
      - 1) Primer: Exterior concrete and masonry primer.
      - 2) Finish Coats: Exterior semi-gloss acrylic enamel.
  - 2. Exterior Concrete Unit Masonry:
    - a. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a block filler.
      - 1) Block Filler: Concrete unit masonry block filler.
      - 2) Finish Coats: Exterior semi-gloss acrylic enamel.
  - 3. Exterior Ferrous Metal:
    - a. Semi-gloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.

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- 1) Primer: Exterior ferrous-metal primer.
  - 2) Finish Coats: Exterior semi-gloss alkyd enamel.
4. Exterior Zinc-Coated Metal (except Raceways):
- a. Semi-gloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.
    - 1) Primer: Exterior zinc-coated metal primer.
    - 2) Finish Coats: Exterior semi-gloss alkyd enamel.
5. Interior Concrete and Masonry (Other Than Concrete Unit Masonry):
- a. Semi-gloss Alkyd-Enamel Finish: Two finish coat(s) over a primer.
    - 1) Primer: Interior concrete and masonry primer.
    - 2) Finish Coats: Interior semi-gloss alkyd enamel.
6. Interior Concrete Unit Masonry:
- a. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a block filler.
    - 1) Block Filler: Concrete unit masonry block filler.
    - 2) Finish Coats: Interior semi-gloss acrylic enamel.
7. Interior Gypsum Board:
- a. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.
    - 1) Primer: Interior gypsum board primer.
    - 2) Finish Coats: Interior semi-gloss acrylic enamel.
8. Interior Ferrous Metal:
- a. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.
    - 1) Primer: Interior ferrous-metal primer.
    - 2) Finish Coats: Interior semi-gloss acrylic enamel.
9. Interior Zinc-Coated Metal (except Raceways):
- a. Semi-gloss Acrylic-Enamel Finish: Two finish coat(s) over a primer.
    - 1) Primer: Interior zinc-coated metal primer.
    - 2) Finish Coats: Interior semi-gloss acrylic enamel.
- C. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

### 3.1 APPLICATION

- A. Raceways and Duct Banks More Than 600 V Concealed within Buildings: 4-inch- (100-mm-) wide black stripes on 10-inch (250-mm) centers over orange background that extends full length of raceway or duct and is 12 inches (300 mm) wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- (75-mm-) high black letters on 20-inch (500-mm) centers. Stop stripes at legends. Apply to the following finished surfaces:
1. Floor surface directly above conduits running beneath and within 12 inches (300 mm) of a floor that is in contact with earth or is framed above unexcavated space.
  2. Wall surfaces directly external to raceways concealed within wall.
  3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- B. Accessible Raceways and Metal-Clad Cables More Than 600 V: Identify with "DANGER-HIGH VOLTAGE" in black letters at least 2 inches (50 mm) high, with self-adhesive vinyl labels. Repeat legend at 10-foot (3-m) maximum intervals.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A: Identify with orange self-adhesive vinyl label.
- D. Accessible Raceways and Cables of Auxiliary Systems: Identify the following systems with color-coded, self-adhesive vinyl tape applied in bands snap-around, color-coding bands:
1. Fire Alarm System: Red.
  2. Fire-Suppression Supervisory and Control System: Red and yellow.
  3. Combined Fire Alarm and Security System: Red and blue.
  4. Security System: Blue and yellow.
  5. Mechanical and Electrical Supervisory System: Green and blue.
  6. Telecommunication System: Blue
  7. Control Wiring: Green and red.
- E. Junction or pullboxes and covers in non-public spaces associated with special systems shall be painted with similar color coding prior to installation.
- F. Power-Circuit Conductor Identification: For primary and secondary conductors No. 1/0 AWG and larger in vaults, pull and junction boxes, manholes, and handholes use color-coding conductor tape and aluminum wraparound marker labels. Identify source and circuit number of each set of conductors. For single conductor cables, identify phase in addition to the above.

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- G. Branch-Circuit Conductor Identification: Where there are conductors for more than three branch circuits in same junction or pull box, use color-coding conductor tape. Identify each ungrounded conductor according to source and circuit number.
- H. Retain first paragraph below for future expansion circuits or if required for circuits for other purposes. Coordinate with Drawings.
- I. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source and circuit number.
- J. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, signal, sound, intercommunications, voice, and data connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and Operation and Maintenance Manual.
- K. Identification of Junction, Pull and Connection Boxes: Provide pressure sensitive, self-adhesive labels indicating system voltage in black pre-printed on orange background as required by NFPA 70 for caution signs on all electrical power and lighting system boxes exceeding 4" in length or width in non-public exposed spaces and in concealed locations. Install on outside of box cover. Also label box covers to identify the circuits contained therein. Use pressure sensitive plastic labels at exposed locations and similar labels or plasticized card stock tags at concealed boxes. Standard 4 inch square junction box cover plates shall be identified with indelible marker on inside at exposed public locations and on exterior at all other locations.
- L. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- M. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Comply with 29 CFR 1910.145 and apply self-adhesive warning labels. Identify system voltage with black letters on an orange background. Apply to exterior of door, cover, or other access.
  - 1. Equipment with Multiple Power or Control Sources: Apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.

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2. Equipment Requiring Workspace Clearance According to NFPA 70: Unless otherwise indicated, apply to door or cover of equipment but not on flush panelboards and similar equipment in finished spaces.

N. Instruction Signs:

1. Operating Instructions: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
2. Emergency Operating Instructions: Install instruction signs with white legend on a red background with minimum 3/8-inch- (10-mm-) high letters for emergency instructions at equipment used for power transfer.

O. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

- a. Outdoor and indoor Equipment: Engraved, laminated acrylic or melamine label or stenciled legend 4 inches (100 mm) high.
- b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.

2. Equipment to Be Labeled:

- a. Panelboards, electrical cabinets, and enclosures.
- b. Access doors and panels for concealed electrical items.
- c. Disconnect switches.
- d. Enclosed circuit breakers.
- e. Contactors.
- f. Voice and data cable terminal equipment.
- g. Fire-alarm control panel and annunciators.
- h. Security and intrusion-detection control stations, control panels, terminal cabinets, and racks.

3. The following items are to be identified as to source of power (as a minimum):

- a. Receptacles
- b. Safety Disconnect Switches

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- c. Junction Boxes
  - d. Snap Switches (on inside of plate with indelible felt-tip marker)
4. The following items are to be identified as to what they service (as a minimum):
- a. Safety Disconnect Switches
  - b. Motor Starters
  - c. Panelboards. Furnish and install a neat metal directory frame with 1/16 inch plastic cover on the inside of each panel cabinet door. Provide typewritten list of the complete circuits in the directory frames, showing portions of building or equipment supplied by each circuit. Minimum card size, 5" x 8" for panels up to 20 circuits; 2 cards above 20 circuits. Numbering odd down left hand side, and even down right. See drawings for panel schedules. The directory shall contain the following detailed information: type(s) of circuit served, room number(s) served, with "actual" room numbers to be used after completion of project.
  - d. Switchboards
  - e. Time Clocks
5. The following items are to be identified to match the identification indicated on the drawings:
- a. Panelboards

### 3.2 INSTALLATION

#### A. General Installation Requirements:

1. Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations, specified or indicated on drawings. Provide numbers, lettering and wording as approved in submittals, as required by code, or as recommended by manufacturers. Coordinate first paragraph below with Drawings.
2. Install products covered by this Section where indicated on drawings or specified. Install products covered by this Section where required by NFPA 70, whether or not otherwise indicated. Install products in accordance with manufacturer's written instructions and requirements of NFPA 70.
3. Where identification is to be applied to surfaces which require finish, install identification after completion of finish work.

- #### B. Location:
- Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

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- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach non-adhesive signs and plastic labels with screws and auxiliary hardware appropriate to the location and substrate.
- F. System Identification Color Banding for Raceways and Cables: Each color band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- G. Color-Coding for Phase and Voltage Level Identification, 600 V and Less: Use the colors listed below for ungrounded service, feeder, and branch-circuit conductors.
  - 1. Color shall be factory applied or, for sizes larger than No. 1/0 AWG if authorities having jurisdiction permit, field applied.
  - 2. Colors for 208/120-V Circuits:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
    - d. Neutral: White
    - e. Ground: Green
- H. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- I. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches (400 mm) overall.
- J. Painted Identification: Prepare surface and apply paint according to Division 09 Painting Sections.

END OF SECTION

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## **262416 PANELBOARDS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings, Contract Forms, Conditions of the Contract, Construction Manager at Risk (CMR) Agreement including Supplemental General Conditions and Exhibits, and other Division 01 Specification Sections, apply to this Section.

#### **1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Distribution panelboards.
  - 2. Lighting and appliance branch-circuit panelboards.
  - 3. Transient voltage suppression panelboards.

#### **1.3 DEFINITIONS**

- A. GFCI: Ground-fault circuit interrupter.
- B. RMS: Root mean square.
- C. SPDT: Single pole, double throw.

#### **1.4 SUBMITTALS**

- A. Product Data: For each type of panelboard, overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard, plug-on UL 1449 5<sup>th</sup> edition surge suppressors and related equipment.
  - 1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
    - a. Enclosure types and details for types other than NEMA 250, Type 1.
    - b. Bus configuration, current, and voltage ratings.
    - c. Short-circuit current rating of panelboards and overcurrent protective devices.

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- d. UL listing for series rating of installed devices.
    - e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
  2. Wiring Diagrams: Power, signal, and control wiring.
  3. Arc Flash and Coordination Study. The contractor shall provide with the submittal, an Arc Flash and coordination study based on the equipment submitted.
    - a. The contractor shall be required to submit equipment equal in characteristics to the basis of design. That is to say the selectivity of the overcurrent devices shall be as clean in coordination as the basis of design devices.
      - i. References to Clean Coordination and selectivity shall be as defined in IEEE Std 242-2001.
      - ii. Selectivity curves shall be labeled with plain English nomenclature that identifies the devices on the project single line diagram, not some software reference file name. Each curve set shall have a 1-line on the same page.
      - iii. Coordination shall reflect all intentions of system planning per IEEE Std 242-2001.
    - b. The contractor may utilize factory trained coordination engineers to prepare the study.
  4. Time current characteristics curves
    - a. Main Circuit Breakers.
    - b. Branch Circuit breakers.
- C. Qualification Data: For testing agency.
- D. Field quality-control test reports including the following:
  1. Test procedures used.
  2. Test results that comply with requirements.
  3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- E. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.
- F. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
  1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.

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2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7.
- C. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories through one source from a single manufacturer.
- D. Product Options: Drawings indicate size, profiles, and dimensional requirements of panelboards and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Comply with NEMA PB 1.
- G. Comply with NFPA 70.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
  1. Ambient Temperature: Not exceeding 104 deg F (40 deg C).
  2. Altitude: Not exceeding 6600 feet (2000 m).
- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
  1. Ambient temperatures within limits specified.
  2. Altitude not exceeding 6600 feet (2000 m).

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1.7 COORDINATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.
- B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.8 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Keys: Six spares for each type of panelboard cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Panelboards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
    - a. Siemens
    - b. Eaton
    - c. Square D

2.2 MANUFACTURED UNITS

- A. Enclosures: Flush- and surface-mounted cabinets, 20 in. wide minimum. NEMA PB 1, Type 1.
  - 1. Material: Enclosures shall be galvanized steel with blank end walls. All knockouts shall be field punched.
  - 2. Rated for environmental conditions at installed location.

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- a. Outdoor Locations: NEMA 250, Type 3R
  - b. Other Wet or Damp Indoor Locations: NEMA 250, Type #3R
3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
  4. Hinged Front Cover: Entire front trim hinged to box and with standard door-in-door piano hinged trim cover.
  5. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.
  6. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
  7. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.
  8. Directory Card: With transparent protective cover, mounted in metal frame, inside panelboard door.
- B. Phase and Ground Buses:
1. Material: Hard-drawn copper, 98 percent conductivity or equivalent aluminum. Contractor shall provide plated busses for all NEMA 3R applications.
  2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.
  3. Fully rated Neutral Bus: Neutral bus rated 100 percent of phase bus.
  4. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads.
- C. Conductor Connectors: Suitable for use with conductor material.
1. Main and Neutral Lugs: Mechanical type.
  2. Ground Lugs and Bus Configured Terminators: Compression type.
  3. Extra-Capacity Neutral Lugs: Rated 200 percent of phase lugs mounted on extra-capacity neutral bus.
- D. Service Equipment Label: UL labeled for use as service equipment for panelboards with main service disconnect switches.
- E. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.
- 2.3 PANELBOARD SHORT-CIRCUIT RATING
- A. Fully rated to interrupt symmetrical short-circuit current available at terminals.
  - B. Series rated equipment shall not be used unless approved by UA Electrical Engineer.

## 2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Main Overcurrent Protective Devices: Bolted Molded case switch with short time rating 10% greater than the short circuit level at the panel, as indicated on short circuit study.
- B. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units. 120/208 volt panels shall have plug in circuit breakers.
- C. Doors: Door in door style with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

## 2.5 OVERCURRENT PROTECTIVE DEVICES

- A. Molded-Case Circuit Breaker: UL 489, with interrupting capacity to meet available fault currents.
  - 1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
  - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
  - 3. Electronic trip-unit circuit breakers shall have RMS sensing; field-replaceable rating plug; and with the following field-adjustable settings:
    - a. Instantaneous trip.
    - b. Long- and short-time pickup levels.
    - c. Long- and short-time time adjustments.
  - 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
  - 5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
  - 6. GFCI Circuit Breakers: Single- and two-pole configurations with 5-mA trip sensitivity.
  - 7. Shunt-Trip breakers: as noted for remote trip capabilities.
- B. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
  - 1. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.

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2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
  3. Multi-pole units enclosed in a single housing or factory-assembled to operate as a single unit.
- C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.
- D. Fuses are specified in Division 26 Section "Fuses."

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install panelboards and accessories according to NEMA PB 1.1.
- B. Mount top of trim 74 inches (1880 mm) above finished floor, unless otherwise indicated.
- C. Mount plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish.
- D. Install overcurrent protective devices and controllers.
  1. Set field-adjustable switches and circuit-breaker trip ranges.
- E. Install filler plates in unused spaces.
- F. For panels mounted flush in walls provide 1 spare 1" conduit per each 3 spare circuits or spaces. Route spare conduits to above lights or to an accessible location.
- G. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

#### 3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 26 Section "Identification for Electrical Systems."

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- B. Create a directory to indicate installed circuit loads after balancing panelboard loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.
- C. Panelboard Nameplates: Label each panelboard with laminated-plastic nameplate mounted with corrosion-resistant screws.
- D. Arc Flash labels: Provide each label with an Arc Flash boundary label and PPE specification.

### 3.3 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.4 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
  - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- C. Perform the following field tests and inspections and prepare test reports:
  - 1. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes.
  - 1. Measure as directed during period of normal system loading.
  - 2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
  - 3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.

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4. Tolerance: Difference exceeding 20 percent between phase loads, within a panelboard, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.
- E. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scanning of each panelboard. Remove panel fronts so joints and connections are accessible to portable scanner.
1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
  2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  3. Record of Infrared Scanning: Prepare a certified report that identifies panelboards checked and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.5 CLEANING

- A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION

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## **262726 WIRING DEVICES**

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings, Contract Forms, Conditions of the Contract, Construction Manager at Risk (CMR) Agreement including Supplemental General Conditions and Exhibits, and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
  - 2. Snap switches
  - 3. Wall-switch

#### 1.3 DEFINITIONS

- A. GFCI: Ground-fault circuit interrupter.
- B. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- C. TVSS: Transient voltage surge suppressor.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Samples: One for each type of device and wall plate specified, in each color specified.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

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1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
  - 1. Cord and Plug Sets: Match equipment requirements.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described in subparagraphs below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Floor Service Outlet Assemblies: One for every 10, but no fewer than one.
  - 2. Poke-Through, Fire-Rated Closure Plugs: One for every five floor service outlets installed, but no fewer than two.
  - 3. TVSS Receptacles: One for every 10 of each type installed, but no fewer than two of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:
  - 1. Hubbell Incorporated; Wiring Device-Kellems (Hubbell) –Shall be basis of Design.
  - 2. Leviton Mfg. Company Inc. (Leviton).
  - 3. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

## 2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A heavy duty tamper-proof industrial specification grade, gray: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498 Supplement SD. Back-wired and side wired.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Hubbell; Hubbell 5362TR, gray or equal Leviton, P & S.

## 2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, non-feed-through type heavy duty industrial, weather-proof, tamper-proof, specification grade, gray. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped. Back-wired and self captivating.
- B. Duplex GFCI Convenience Receptacles, gray, 125 V, 20 A: Comply with UL 498 Supplement SD.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Hubbell; GF5362SGGY or equal Leviton, P & S.
    - b. Leviton; 6898-HG.
    - c. Pass & Seymour; 2091-SHG.

## 2.4 SNAP SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A, Back-wired and side wired heavy duty specification grade, gray:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
    - b. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
    - c. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

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- C. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A, Back-wired and self captivating: for use with mechanically held lighting contactors.
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Hubbell; HBL1557.
    - b. Leviton; 1257.
    - c. Pass & Seymour; 1251.

## 2.5 WALL PLATES

- A. Single and combination types to match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished stainless steel or painted stainless per Architect.
  - 3. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant, die-cast aluminum with lockable cover.

## 2.6 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
  - 1. Wiring Devices Connected to Normal Power System: Gray, unless otherwise indicated or required by NFPA 70 or device listing.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:

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1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. All devices shall be pig tail connected.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

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- F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multi-gang wall plates.
- H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

### 3.2 IDENTIFICATION

- A. Comply with Division 26 Section "Identification for Electrical Systems."
  - 1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

### 3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
  - 1. Test Instruments: Use instruments that comply with UL 1436.
  - 2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- B. Tests for Convenience Receptacles:
  - 1. Line Voltage: Acceptable range is 105 to 132 V.
  - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
  - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
  - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
  - 6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.

END OF SECTION  
END OF DIVISION

**DIVISION 31 – EARTHWORK**

**311000 EARTHWORK**

1. GENERAL:

- A. SCOPE: This section of the specifications includes furnishing all labor, materials and equipment necessary to complete all site and earthwork as indicated on the drawings and/or as hereinafter specified including but not necessarily limited to the following:
  - (1) Project layout and verification
  - (2) General protection responsibilities
  - (3) Site preparation and rough grading
  - (4) Earth excavation, filling and compaction
  - (5) Finished grading
- B. Related Sections:
  - (1) 015100 –Site Protection
  - (2) 312150 - Excavation, Filling and Backfilling
  - (3) 312210 - Trenching and Backfilling
- C. Geotechnical Engineering Report: The Owner has secured a Geotechnical Engineering Report from Western Technologies dated September 9, 2024. WTI#29-224101-2 for this project. A copy is included in this specification for reference. The Contractor shall adhere to all recommendations contained therein.
- D. Project Layout: Contractor shall employ and pay for the services of a registered surveyor licensed to practice in the State of Arizona to lay out the work and check and verify all elevations, dimensions, etc., prior to starting construction. Any discrepancies in the above shall be immediately reported to the Architect. All grades, lines, levels and benchmarks shall be established by the general Contractor who shall be responsible for same. From time to time, the surveyor shall check the work for proper alignment, location, elevations, etc.
- E. General Protection Responsibilities:

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- (1) Engineering Responsibility: Contractor for this work shall be responsible for all engineering and safety for execution of his work. Provide and install shoring, needles, bracing and wedging to support or protect any excavation, banks, sidewalks, walls and other structures. All shores, needles or braces shall be located so as not to interfere with the construction. Work shall be done in accordance with competent engineering practices and local building codes. Location of cuts, fills, and excavations shall be the responsibility of the Contractor.
- (2) Protection of Persons: Protection of all persons shall be provided at all times. The work shall proceed in such manner as to prevent the undue spread of dust and flying particles. Provide all necessary temporary protective barriers and fencing as required.
- (3) Preservation and Restoration of Property: The Contractor shall be responsible for the preservation of all public and private property on the surface or underground, along and adjacent to the work, and shall conduct his operation so as to insure the prevention of injury or damage thereto. No land monuments or similar property shall be disturbed or moved until an authorized agent of the Architect has witnessed or otherwise referenced their location. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, or as the consequence of the non-execution thereof on the part of the Contractor, such property shall be restored by the Contractor, at his own expense, to a condition equal to that existing before rebuilding, or otherwise restoring same, or he shall make good such damage or injury in an acceptable manner.
- (4) Existing Utilities: The existing utilities service lines and utilities structures, whether shown on the drawings or not, shall be protected and safeguarded from damage during earthwork operations and, if damaged, shall be repaired by the Contractor at his expense.
  - a. The above provisions are applicable to all or any portion of utilities service lines and utilities structures which project above the original surface or lie beneath the ground surface within any grading area.

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- (5) Landscape Protection: Contractor shall take all necessary precautions to preserve without damage any trees or landscaping within the property lines, except those specifically designated for removal and disposal. Verify with Architect.
- (6) Burning Debris: No materials or debris shall be burned on the premises.
- (7) Dynamite and Powder: No dynamite or powder shall be used or brought to the site.
- (8) Dust Control: Contractor is responsible for water and equipment required to keep dust to a minimum during grading and excavation.

F. Soils Engineering and Tests:

- (1) Qualified Soils Testing agency shall be employed to observe the placement and compaction of all fill at the site, to take all samples required for tests as required. Testing shall be done by an approved and independent testing laboratory.
- (2) Payment of tests and services of testing agency shall be the responsibility of the Owner.
- (3) Test reports shall be delivered to the Owner and duplicate copies to the Architect and Engineer.
- (4) Contractor's Responsibility: To notify the soils testing agency when filling and compaction are to take place and know that tests are taken.

2. PRODUCTS:

A. Fill and Backfill:

- (1) Fill required to backfill walls or to construct building site shall conform to the referenced geotechnical engineering report for the project.

B. Base Course: An aggregate base course of 4" thickness (compacted thickness) shall be placed under all on-grade concrete slabs, consisting of sand and gravel as directed by the soils report

and shall be compacted to a minimum 95% of the ASTM D698.

3. EXECUTION:

A. Site Preparation:

- (1) General: The site, where indicated on the drawings, shall be cleared of all natural obstructions and any other items which will interfere with the construction operations or as designated for removal a minimum of 5' beyond the perimeter of the new buildings as directed by this specification and the soils report.
- (2) Grubbing: All stumps and subsurface roots larger than three inches (3") in diameter and matted roots existing within the area bounded by lines five feet (5') outside of structure foundations shall be removed. In other areas of construction all stumps and subsurface roots larger than three inches (3") in diameter and all matted roots shall be removed to a depth of 18" below any sub-grade shoulder slope or existing grade.
- (3) Strip and remove all existing rubble, debris, vegetation, obviously loose surface soils from the building areas. Any depressions, ditches, trenches, etc. should be cleaned and widened to accommodate compaction equipment.
- (4) The criteria provided in the geotechnical engineering report should be used in determining the minimum depth of any over-excavation and engineered fill required below the shallow footings and the minimum distance it should extend beyond the footing edges. It may be more practical to remove soils to the maximum depth beneath all portions of the structure area. If this is done, the removal and re-compaction should extend at least five feet beyond the perimeter footings.
- (5) After any over excavation has been accomplished, the exposed soils should be scarified, moistened, or dried as required, and compacted to a minimum depth of 10 inches. If clay soils are exposed at finished sub-grade in floor slab areas, the clayey soils shall be removed replaced with engineered fill to the depths indicated in the geotechnical engineering report.
- (6) Place fill in maximum 10-inch loose lifts and compact the fill such that specified densities are achieved. All earthwork for

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the building pad should extend at least 5 feet beyond the perimeter footings.

- (7) **Separate Topsoil:** All topsoil affected by rough grading, and/or excavations shall be stockpiled on site separately and shall not be used for backfill, but shall be conserved as directed by the Architect and utilized for topsoil in rough and final grading as specified herein.
- (8) **Planting Areas:** All foreign matter shall be removed to a depth of at least two feet (2') below the new finish grade.
- (9) **Rough Grading:** Uniformly smooth grading of all areas covered by the project, including excavated and filled sections and adjacent transition areas shall be accomplished. The finished surface shall be reasonably smooth, compacted, and free from irregular surface changes. The degree of finish shall be that ordinarily obtainable from either blade-grader or scraper operations, except as otherwise specified. All ditches shall be finished so as to drain readily.

B. **Compaction:**

- (1) The sub-grade shall be scarified, moistened (or dried, as required), and re-compacted for a minimum depth of 10 inches before placement of fill materials.
- (2) Compaction of backfill and fill shall be performed in horizontal lifts not exceeding 10" loose thickness, and shall attain the following specified percent of maximum density at the appropriate optimum moisture content as determined in accordance with ASTM Designation D698.

| <u>MATERIAL</u>  | <u>% COMPACTION</u> |
|--|---------------------|
| On-site sub-grade soils (reworked)<br>and sub-base fill: |                     |
| Below footings   | 95                  |
| Below slabs -on-grade                                    | 95                  |
| Below pavement   | 95                  |
| <br>Imported fill:                                       |                     |
| Below footings   | 95                  |
| Below slabs-on-grade                                     | 95                  |

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|                                   |                     |
|-----------------------------------|---------------------|
| Below pavement                    | 95                  |
| <u>MATERIAL</u>                   | <u>% COMPACTION</u> |
| Base course (beneath floor slabs) | 95                  |
| Base course (beneath pavements)   | 100                 |
| Miscellaneous backfill            | 90                  |

Any soil disturbed during construction should be re-compacted to the percent compaction as specified above.

Soils below paved areas in which moisture contents have been increased above in-situ moistures, shall be compacted to full depth and width of the increased moisture. Compaction shall be in accordance with the above or to the satisfaction of the soils engineer.

- (3) Moisture Content: On-site clayey soils and approved import fill soils should be compacted at moisture contents outline below.

| <u>MATERIAL</u>                   | <u>% Range of Moisture Contents</u> |         |
|-----------------------------------|-------------------------------------|---------|
|                                   | Minimum                             | Maximum |
| Below footings                    | -3                                  | +3      |
| Below slabs -on-grade             | -1                                  | +3      |
| Below pavement                    | -3                                  | +3      |
| Base course (beneath floor slabs) | -3                                  | +3      |
| Base course (beneath pavements)   | -3                                  | +3      |
| Miscellaneous backfill            | -3                                  | +3      |

- (4) Preparation and placement of fill materials: Fill materials shall be thoroughly mixed to a uniform moisture content. Materials shall be placed and compacted in 10" maximum horizontal lifts at a depth compatible with the compaction equipment being used.

- C. All excavation of the building site and for footings shall be carried to a depth as shown on the plans.

Bottoms of all footings shall be finished by hand to insure solid bearing free of loose earth. All debris and large stones uncovered shall be removed from the premises. Earth obtained from excavation and not used as fill for other parts of the site shall be removed from the premises, unless directed by the Architect.

- (1) Excavation shall comprise and include the satisfactory

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removal and disposition of all materials excavated regardless of the nature of materials encountered and which shall therefore be understood to include both rock excavation and common excavation when both classes are present. All suitable excavated materials shall be transported to and placed in the fill areas within the limits of the work except as otherwise directed by the Soils Testing Agency and/or Architect.

- (2) Where material encountered within the limits of the work is considered unsuitable by the Soils Testing Agency and/or Architect, such material shall be excavated below the grade shown on the drawings as directed, and the excavation shall be re-compacted with suitable material to the compaction required in structural notes. Native soils are considered suitable for use in compacted fills below building areas, if the criteria of Paragraph 2.a.(2)(a) are met.
- (3) Excavation and filling shall be performed in a manner and sequence that will provide drainage at all times.
- (4) Excavation shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, installation of services, and for inspection, except where the concrete for walls and footings is authorized to be deposited directly against excavated surfaces. Undercutting will not be permitted.
- (5) Shoring, including sheet piling, shall be installed to protect workmen and the banks, adjacent paving structures, and utilities.

D. Fill and Backfill:

- (1) Sub-base fill shall be placed in lifts thin enough that at least the minimum recommended density is obtained throughout each lift.
- (2) Except for otherwise specified, each layer shall be spread uniformly by the use of a road machine or other approved device and rolled with an approved tamping roller, heavy pneumatic roller, 3-wheeled power roller or by other suitable equipment sufficient to compact as specified.
- (3) After completion of foundation footings and walls, and other construction below the elevation of the final grade and prior

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to backfilling, all forms shall be removed and the excavation shall be cleaned of all trash and debris.

- (4) Material for backfilling shall conform with the specification for the "Sub-base Fill" herein before specified.
- (5) No backfill to be placed against footings or walls until concrete is thoroughly set. Backfill shall be placed symmetrically to prevent eccentric loading upon or against structures. Backfill, including utility trench backfill, shall be placed in six inch (6") horizontal layers, and compacted to 95% of the maximum density of the optimum moisture content as determined in accordance with ASTM D-698.
- (6) All topsoil secured from rough grading and/or excavation operations shall be distributed on the site during finish grading operations as directed by the Soils Testing Agency and/or Architect.
- (7) Topsoil: Previously stockpiled shall be used for backfill in planters. Six inch (6") minimum thickness, finishing level with finish grades required, and a surplus shall be used on areas designated for lawns, also finishing level with the finish grades required.

E. Grading:

- (1) Existing and finish grades are indicated on the plans. The site where shown on the plans only shall be rough graded with ground surface being cut or filled as required to meet the finished grades shown, leaving no depressions in which water may puddle.
- (2) Finish grading around the building shall be reasonably smooth and carried out from the building in a manner to provide uniform drainage way from the building.
- (3) Grading required for paved areas shall be done in a manner that the specified thickness of paving will meet the finish grades shown. This area shall be compacted with water and a heavy roller before paving.
- (4) Newly graded areas shall be protected from the action of the elements and any settlement or washing that may occur from that or any other cause, prior to acceptance of the work shall be required and grades re-established to the required

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elevations and slopes.

END OF SECTION

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### **312150 EXCAVATION, FILLING, AND BACKFILLING**

#### **1. GENERAL:**

##### **A. Description of Work:**

- (1) Work as evident on drawings and specified herein or required by the Geotechnical Report to accomplish the excavation, filling and backfilling, and all operations pertaining thereto for buildings, complete.
- (2) The Geotechnical Report by Terracon Consultants, Inc., Report #63185108, dated January 10, 2019 included after section 311000 of the Specifications, is the governing requirement for all earthwork associated with the site.
  - a. Borings and subsurface data indicated in the Geotechnical Report shall be general information only and variation therefrom shall not affect the terms of the contract.

##### **B. Work Excluded**

- (1) Site excavation and backfilling for plumbing, heating and electrical work beyond 5 feet from the building is included in Section 312210, Trenching and Backfilling.

##### **C. Inspections and Tests**

- (1) Inspections and Tests: The Geotechnical Engineer of record shall inspect, and test the preparation of excavations, filling, stripping of existing fill, compaction, and soil materials as described in 'Excavation, Soil Materials and Placing And Compaction' herein. A letter of compliance, together with copies of inspection reports and test reports, stating conformance to the Geotechnical Engineering Evaluation and Specifications shall be submitted to the Architect/Engineer in triplicate for approval.
- (2) The Owner shall pay all testing agency charges for these services. Costs of any re-testing required due to improper compaction shall be accomplished by the same laboratory of record and shall be paid for by the Contractor.

#### **2. PRODUCTS**

##### **A. Soil Materials**

- (1) Fill material shall consist of suitable material removed from excavated areas and imported borrow material as required. Fill

materials shall be free of roots and other organic materials, trash, frozen material, and particles having a dimension greater than 6". Imported fill shall be compatible with approved on site materials. Materials shall be in conformance with the referenced Geotechnical Report.

- (2) Base course shall conform to the referenced Geotechnical Report.

### 3. EXECUTION

#### A. Excavation

- (1) Perform all excavations as indicated on the drawings or as required for a complete installation. All foundations shall bear on materials and at minimum depths as indicated in the Geotechnical Report.
- (2) The subgrade within the building pad shall be prepared as indicated in the Geotechnical Report.
- (3) Bottom of all excavations shall be level and true. If by error, portions of the excavations are extended too deep, only concrete will be permitted for refill material. No compensation will be allowed for such material.
- (4) All foundation excavations shall be reviewed and accepted by the Geotechnical Engineer/Representative before foundation reinforcing and concrete is placed. Architect shall be given at least 24 hours notice before any concrete is placed.
- (5) Where suitable supporting soils are encountered at different elevations than those indicated, the Architect and Geotechnical Engineer may direct in writing that the excavations be carried to elevations above or below those indicated. An extra or credit, as the case may warrant, shall be based on a unit price for such excavation and concrete work.
- (6) Grading in vicinity of structure shall be controlled to prevent surface water from running into excavated areas or across the building pad. The Contractor shall provide and maintain at all times during construction ample means and devices with which to promptly remove and properly dispose of all water entering the excavation or other parts of the work. If water enters excavations after having been completed to establish bearing levels, additional excavation may be required to a depth exposing dry, firm bearing soils as determined by the Geotechnical Engineer. The excavation shall be filled to original bearing levels with concrete as specified unless otherwise approved by the Geotechnical Engineer. No foundations or floors shall be constructed on disturbed soils or in water.

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- (7) Where necessary, excavations shall be properly sheeted and braced to furnish safe and acceptable working conditions. The bracing shall be so arranged as not to place any stress on portions of the completed work, without special written approval of the Architect.
- (8) All excess materials from excavations shall be disposed of by the Contractor off the building site.

B. Placing and Compaction

- (1) Each lift shall be uniformly compacted to not less than the percentage of the maximum density specified below before another lift is placed. Minimum compaction requirements are indicated in the referenced Geotechnical Report.
- (2) Where backfill is required on both sides of construction, keep backfill at approximately the same elevation on both sides.
- (3) Backfill around all building foundation walls and footings shall be placed and compacted at near optimum moisture content, but shall not be saturated or at a moisture content that results in pumping. In no case shall backfill be water-settled. Non-structural concrete is acceptable for use as back fill (see Section 033000).
- (4) Grade to finished elevations as shown on Drawings, or as necessary to provide positive drainage away from the building as approved by Architect. Finish grading within 20 feet of building shall be hand-raked for "fine" finish. Contractor shall coordinate and verify elevations required in landscaped areas, paving, etc.

C. Base Course

- (1) Under all interior concrete floors on grade and under all exterior concrete slabs on grade, place a minimum 4 inch thick layer of base course. This material shall not be placed until all work of other trades which passes through or under this work has been properly placed and approved and not until foundations are completed and surface receiving this material is finished as specified. Base course shall be compacted in accordance with the referenced Geotechnical Report.

END OF SECTION

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### **312210 TRENCHING AND BACKFILLING**

1. GENERAL:

A. Related Documents:

- (1) Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications sections, apply to work in this section.

B. Description of Work:

- (1) Work as evident on drawings and specified herein or required to accomplish the designated excavation, trenching and backfilling for site utilities systems, to the points of connection with the building utilities 5 feet outside the building.

2. PRODUCTS:

A. Fill Material:

- (1) See Section 311000 Earthwork.

3. EXECUTION:

A. Excavation:

- (1) General: All excavation of every description of whatever substances encountered shall be performed to the depths indicated or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted as indicated or as directed. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations, and any water accumulating therein shall be removed by pumping or by other approved methods. All trenching must be shored and/or otherwise protected as required to meet all local and OSHA Safety Standards.
- (2) Trench Excavation: Trenches shall be of the necessary width for proper laying of pipe. The banks of pipe trenches shall be as nearly vertical as practicable. Care shall be taken not to over-excavate. The bottom of the trenches shall be accurately graded. Clean coarse sand, well graded gravel or well graded crushed rock

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must be used as trench bedding. The trench must be filled with this material to the springline of the pipe, placed in 6" maximum lifts and compacted to 95% maximum density - ASTM D-1557. The remainder of the trench shall be backfilled with specific backfill material. The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not exceed 8 inches on either side of the pipe. The width of the trench above that level shall be as wide as necessary for sheeting and bracing and the proper performance of the work.

B. Removal of Utility Lines:

- (1) When utility lines that are to be removed are encountered within the area of operations, the Contracting Officer's Representative shall be notified in ample time for the necessary measures to be taken to prevent interruption of the service.

C. Backfilling:

- (1) The trenches shall not be backfilled until all required pressure tests are performed and until the utilities systems as installed conform to the requirements specified in the several sections covering the installation of the various utilities. Where, in the opinion of the Architect, damage is likely to result from withdrawing sheeting, the sheeting shall be left in place and the contract price will be adjusted accordingly. Except as otherwise specified for special conditions of overdepths, trenches improperly backfilled shall be reopened to the depth required for proper compaction, then refilled and compacted as specified, or the condition shall be otherwise corrected as approved.
- (2) The surface shall be restored to its original condition as near as practicable and as hereinafter specified. Pavement, base course, and compacted subgrade disturbed by trenching operations shall be replaced in an acceptable manner with materials equal to the adjacent compacted subgrade, base course, and pavement for a minimum distance of 12 inches on each side of the trench.
- (3) Lower Portion of Trench: Backfill material shall be deposited in 6-inch-maximum-thickness layers and compacted with suitable tampers to density of the adjacent soil or graded as hereinafter specified until there is a cover of not less than 2 feet over sewers and 1 foot over other utility lines. The backfill material in this portion of the trench shall consist of a selected material at a moisture content that will facilitate compaction, free from stones

Willcox High School  
Wrestling Room Remodeling & Addition

larger than 3 inches in any dimension and hard clods and frozen conglomerates larger than 3 inches in any dimension, except that where the pipe is coated or wrapped for protection against corrosion the backfill material shall be free from stones larger than 1 inch in any dimension. If any portion of the cover in the lower portion of the trench is in the depth of special compaction and materials requirements under pavement the special requirements shall control. Special care shall be taken not to damage the coating or wrapping of pipes.

- (4) Remainder of Trench: Except for special materials for pavements, the remainder of the trench shall be backfilled with material that is free of stones larger than 3 inches or 1/2 the layered thickness, whichever is smaller, in any dimension. Backfill material shall be deposited in layers not exceeding the thickness specified, and each layer shall be compacted to the minimum density specified as applicable to the particular areas (except that in areas other than under parking areas, and other paved areas subject to vehicular movement, settling of granular, noncohesive material with water will be permitted). Degree of compaction shall be as follows, expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D-698.
  - a. Under Pavements: Six-inch layers, 95 percent maximum density up to the elevations at which the requirements for pavement subgrade materials and compaction control.
  - b. Under Sidewalks: Six-inch layers, 95 percent maximum density.
  - c. Under Other Areas: Six-inch layers, 90 percent maximum density.
- (5) Testing: All trench backfill material shall be tested as indicated in Division 1.

END OF SECTION

Willcox High School  
Wrestling Room Remodeling & Addition

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**313116 TERMITE TREATMENT**

1. GENERAL:
  - A. Treat all areas under building and footings to form an impermeable barrier and as required to provide warranty.
  - B. Warranty:
    - (1) New Structures: Furnish Owner with Certificate of Performance from approved company insuring Owner against damage from termites for five (5) years.
  - C. All chemicals shall meet all EPA regulations.
  - D. Submit information on proposed chemicals.
2. PRODUCTS:
  - A. The Contractor shall propose the termiticide to be utilized.
3. EXECUTION:
  - A. Apply solution along the inside of foundation walls, both sides of interior partitions and expansion joints and around all plumbing and other utilities that penetrate the slab at a rate of two (2) gallons per five (5) linear feet or as required by manufacturer.
  - B. Apply in strict accordance with all manufacturer's labeled directions and Federal regulations.

END OF SECTION  
END OF DIVISION

Willcox High School  
Wrestling Room Remodeling & Addition

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# GEOTECHNICAL EVALUATION REPORT

## **WILCOX HIGH SCHOOL WRESTLING BUILDING ADDITION AND TRACK PAVING**

240 North Bisbee Avenue  
Willcox, Arizona  
WT Job No. 29-224101-2

### **PREPARED FOR:**

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7350 East Speedway Boulevard, Suite 210  
Tucson, Arizona  
Attn: Mark Bollard, AIA

September 9, 2024



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**GEOTECHNICAL    ENVIRONMENTAL    INSPECTIONS    NDT    MATERIALS**

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**GEOTECHNICAL EVALUATION  
WILLCOX HIGH SCHOOL  
WRESTLING BUILDING ADDITION AND TRACK PAVING  
240 NORTH BISBEE AVENUE  
WILLCOX, ARIZONA  
JOB NO. 29-224101-2**

**1.0 PURPOSE**

This report contains the results of our geotechnical evaluation for a proposed wrestling building addition and track paving to be located in Willcox, Arizona. The purpose of these services is to provide information and recommendations regarding:

- Subsurface conditions
- Foundation design parameters
- Lateral earth pressures
- Earthwork guidelines
- Pavement sections
- Drainage
- Groundwater
- Corrosivity (soil to concrete)
- Slabs-on-grade
- Seismic conditions
- Excavation conditions
- Soil Agronomy

Results of the field exploration, field tests, and laboratory testing program are presented in the Appendices.

**2.0 PROJECT DESCRIPTION**

We understand the proposed wrestling building addition will be a single-story, slab-on-grade structure using wood-frame and/or masonry construction. Maximum wall and column loads are assumed to be 4 kips per linear foot (klf) and 50 kips, respectively. We anticipate that ground floor level will be within 2 feet of existing site grade and that no extraordinary slab criteria are required. A new asphalt concrete and acrylic surfacing on the track will be included as part of the project. Should this information not be correct, we should be notified immediately.

## 3.0 SCOPE OF SERVICES

### 3.1 Field Exploration

One boring was drilled to a depth of about 21.5 feet below existing site grade in the proposed building areas. In addition, two borings were drilled to depths of about 5 feet in the proposed paved track area. Also, one boring was excavated in the football field using hand tools for agronomy testing. The borings were at the approximate locations shown on the attached Boring Location Diagram. A field log was prepared for each boring. These logs contain visual classifications of the materials encountered during drilling as well as interpolation of the subsurface conditions between samples. Final logs, included in Appendix A, represent our interpretation of the field logs and may include modifications based on laboratory observations and tests of the field samples. The final logs describe the materials encountered, their thickness, and the locations where samples were obtained.

The Unified Soil Classification System was used to classify soils. The soil classification symbols appear on the boring logs and are briefly described in Appendix A. Local and regional geologic characteristics were used to estimate the seismic design criteria.

### 3.2 Laboratory Analyses

Laboratory analyses were performed on representative soil samples to aid in material classification and to estimate pertinent engineering properties of the on-site soils for preparation of this report. Testing was performed in general accordance with applicable standard test methods. The following tests were performed, and the results are presented in Appendix B.

- Water content
- Dry density
- Compression
- Moisture-density relationship (proctor)
- Expansion
- Plasticity
- Minus #200 sieve
- Soil agronomy

### 3.3 Analyses and Report

This geotechnical engineering report includes a description of the project, a discussion of the field and laboratory testing programs, a discussion of the subsurface conditions, and design recommendations as appropriate to its purpose. The scope of services for this project does not include, either specifically or by implication, any environmental

assessment of the site, discovery of underground storage tanks or other underground structures, or identification of contaminated or hazardous materials or conditions. If there is concern about the potential for such contamination, other studies should be undertaken. We are available to discuss the scope of such studies with you.

## **4.0 SITE CONDITIONS**

### **4.1 Surface**

Existing site development consisted of the Willcox High school track and field, and the existing wrestling building. Fills or underground facilities such as septic tanks, cesspools, basements, utilities, and dry wells were not observed. The ground surface was relatively flat and vegetation consisted of the landscaped grass in the field area. There was no vegetation in the vicinity of the wrestling building addition area . Site drainage trended to the south as sheet surface flow, although shallow depressions existed.

### **4.2 Subsurface**

As presented on the Boring Logs, surface soils to depths of 15 feet consisted of medium dense to dense Clayey SAND. Near surface soils are of medium to high plasticity. The materials underlying the surface soils and extending to the full depth of exploration consisted of stiff to very stiff Sandy CLAY and Sandy Silty CLAY. No apparent zones of carbonate cementation were encountered. Groundwater was not encountered in any boring at the time of exploration. A detailed description of the soils encountered can be found on the boring logs in Appendix A.

## **5.0 GEOTECHNICAL PROPERTIES & ANALYSIS**

### **5.1 Laboratory Tests**

Laboratory test results (see Appendix B) indicate that on-site subsoils near shallow foundation level exhibit low compressibility at existing water contents. Low additional compression occurs when the water content is increased.

Near-surface soils are of medium to high plasticity. These soils exhibit low to moderate expansion potential when recompacted, confined by loads approximating floor loads and

saturated. Slabs-on-grade supported on recompacted on-site soils have a low to medium potential for heaving if the water content of the soil increases.

Chemical tests for soil agronomy were performed on representative samples of on-site soils. The tests were performed by Motzz Laboratories, Inc. and the test results and a soil amendment recommendation letter are presented in Appendix C.

## **5.2 Field Tests**

On-site subsoils near shallow foundation level exhibited medium resistance to penetration using the standard penetration test method (ASTM D1586) and ring-lined barrel sampler (ASTM D3550).

The boring logs included in this report are indicators of subsurface conditions only at the specific location and date noted. Variations from the field conditions represented by the borings may become evident during construction. If variations appear, we should be contacted to re-evaluate our recommendations.

## **6.0 RECOMMENDATIONS**

### **6.1 General**

Recommendations contained in this report are based on our understanding of the project criteria described in Section 2.0 and the assumption that the soil and subsurface conditions are those disclosed by the explorations. Others may change the plans, final elevations, number and type of structures, foundation loads, and floor levels during design or construction. Substantially different subsurface conditions from those described herein may be encountered or become known. Any changes in the project criteria or subsurface conditions shall be brought to our attention in writing. This report does not encompass the effects, if any, of underlying geologic hazards or regional groundwater withdrawal and expresses no opinion regarding their effects on surface movements at the project site.

### **6.2 Foundations**

Shallow spread-type footings may be used to support the proposed structure. The foundations should bear on engineered fills achieved by removal and recompaction of the

soils below foundations. The depth and lateral extent of the engineered fills is presented in the **EARTHWORK** section of this report.

Alternative footing depths and allowable bearing capacities are presented in the following tabulation:

| Footing Depth Below Finished Grade <sup>1</sup> (ft) | Allowable Bearing Capacity <sup>2</sup> (psf) |
|--|---|
| 1.5  | 2,000   |
| 2.0  | 2,500   |

We anticipate that total settlement of the proposed structure, supported as recommended, should be less than  $\frac{3}{4}$  inch. Differential settlement is anticipated to be less than  $\frac{1}{2}$  inch. Additional foundation movements could occur if water from any source infiltrates the foundation soils. Therefore, proper drainage should be provided in the final design and during construction.

Footings should have minimum widths in accordance with local building codes. The bearing capacities given are net bearing capacities and the weight of the concrete in the footings may be ignored.

We recommend that the geotechnical engineer or his representative observe the footing excavations before reinforcing steel and concrete are placed. This observation is to evaluate whether the soils exposed are similar to those anticipated for support of the footings. Any soft, loose or unacceptable soils should be undercut to suitable materials and backfilled with approved fill materials or lean concrete. Soil backfill should be properly compacted.

### 6.3 Lateral Design Criteria

Lateral loads may be resisted by concrete interface friction and by passive resistance. For shallow foundations bearing on properly compacted fill at this site, we recommend the following lateral resistance criteria:

---

<sup>1</sup> Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

<sup>2</sup> Allowable bearing capacities assume fulfillment of **EARTHWORK** recommendations. Pounds per square foot (psf).

- Passive:
  - Shallow wall footings.....250 psf/ft
  - Shallow column footings .....400 psf/ft
  
- Coefficient of base friction (passive).....0.30

Earth retaining structures less than 10 feet in height, above any free water surface, with level backfill and no surcharge loads may be designed using the equivalent fluid pressure method. Recommended active equivalent fluid pressures and coefficients of base friction for unrestrained elements are:

- Active:
  - Undisturbed subsoil.....40 psf/ft
  - Compacted granular backfill .....30 psf/ft
  - Compacted site soils.....35 psf/ft
  
- Coefficient of base friction (active).....0.40

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At-rest:
  - Undisturbed subsoil.....60 psf/ft
  - Compacted granular backfill .....55 psf/ft

The equivalent fluid pressures presented herein do not include the lateral pressures arising from the presence of:

- hydrostatic conditions, submergence or partial submergence
- sloping backfill, positively or negatively
- surcharge loading, permanent or temporary
- seismic or dynamic conditions

We recommend a free-draining soil layer or manufactured geosynthetic material be constructed adjacent to the back of any retaining walls. A filter may be required between the soil backfill and drainage layer. This drainage zone should help prevent development of hydrostatic pressure on the wall. This vertical drainage zone should be tied into a gravity

drainage system at the base of the wall. It is important that all backfill be properly placed and compacted. Backfill should be mechanically compacted in layers. Flooding or jetting should not be permitted. Care should be taken not to damage the walls when placing the backfill. Backfills should be observed and tested during placement.

Fill against footings, stem walls, and any retaining walls should be compacted to densities specified in **EARTHWORK**. Clayey soils should not be used as backfill against retaining walls. 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 movements.

#### 6.4 **Seismic Considerations**

Structures should be designed in accordance with applicable building codes. The seismic design parameters presented in the following table, in accordance with the 2012 International Building Code and ASCE 7-10, are applicable to the project site:

| <b>Seismic Design Parameters<br/>International Building Code 2012, ASCE 7-10</b> |        |
|--|--------|
| Soil Site Class  | D      |
| Mapped Spectral Response Acceleration at 0.2 sec period ( $S_s$ )                | 0.248g |
| Mapped Spectral Response Acceleration at 1.0 sec period ( $S_1$ )                | 0.074g |
| Site Coefficient for 0.2 sec period ( $F_a$ )                                    | 1.600  |
| Site Coefficient for 1.0 sec period ( $F_v$ )                                    | 2.400  |
| Design Spectral Response Acceleration at 0.2 sec period ( $S_{DS}$ )             | 0.265g |
| Design Spectral Response Acceleration at 1.0 sec period ( $S_{D1}$ )             | 0.119g |

The soil site class is based upon conditions identified in shallow explorations and local knowledge of the soil conditions in the vicinity of the site. Soil conditions extending beyond the depth of our explorations to a depth of 100 feet were assumed for the purposes of providing the information presented in the table.

#### 6.5 **Conventional Slab-on-Grade Support**

Floor slabs can be supported on properly placed and compacted fill. The slab subgrade should be prepared by the procedures outlined in this report. A minimum 4-inch layer of base course should be provided beneath all slabs to help prevent capillary rise and a damp

slab. The modulus of subgrade reaction (k) is estimated to be 250 pounds per cubic inch (pci), based upon a 30-inch diameter plate.

The use of vapor retarders or barriers is desirable for any slab-on-grade where the floor will be covered by products using water based adhesives, wood, vinyl backed carpet, impermeable floor coatings (urethane, epoxy, acrylic terrazzo, etc.) or where the floor will be in contact with moisture sensitive equipment or product. When used, the design and installation should be in accordance with the recommendations given in ACI 302.1R and 302.2R. Final determination on the use of a vapor retarder should be left to the slab designer.

All concrete placement and curing operations should follow the American Concrete Institute manual recommendations. Improper curing techniques and/or high slump (high water-cement ratio) could cause excessive shrinkage, cracking or curling. Concrete slabs should be allowed to cure adequately before placing vinyl or other moisture sensitive floor covering.

## 6.6 Drainage

The major cause of soil problems in this vicinity is moisture increase in soils below structures. Therefore, it is extremely important that positive drainage be provided during construction and maintained throughout the life of the proposed building. Infiltration of water into utility or foundation excavations must be prevented during construction. It is also important that proper planning and control of any landscape and irrigation practices be performed.

In areas where sidewalks or paving do not immediately adjoin the structure, protective slopes should be provided with an outfall of 5 percent for at least 10 feet from perimeter walls. Scuppers and drainpipes should be designed to provide drainage away from the structure for a minimum of 10 feet. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to minimize the possibility of moisture infiltration.

Water and sewer utility lines should be properly installed to avoid possible sources for subsurface saturation. It is important that all utility trenches be properly backfilled. If practicable, planters and/or landscaping should not be constructed adjacent to or near structure. If planters and/or landscaping are adjacent to or near the structure, we recommend the following:

- Planters should be sealed
- Grades should slope away from the building
- Only shallow rooted landscaping should be used
- Watering should be kept to a minimum

It should be understood that these recommendations will help reduce the potential for soil movement and resulting distress but will not eliminate this potential.

### 6.7 Corrosivity to Concrete

In order to be consistent with standard local practice and for reasons of material availability, we recommend a Type II portland cement be used for all concrete on and below grade.

### 6.8 Pavements

It is understood that the existing track pavement section consists of 1½ to 2 inches of asphalt concrete. It is recommended that the asphalt concrete should be pulverized to their full depth. The resulting asphalt concrete millings may be used as part of the aggregate base course below the new pavements, discarded, or used as fill in another area of the site. The following minimum athletic pavement section is recommended:

| Traffic Area                              | Asphalt Concrete Pavement (inches) | Base Course (inches) |
|---|------------------------------------|----------------------|
| Athletic Track Alternative 1 <sup>3</sup> | 2½                                 | 4                    |
| Athletic Track Alternative 2 <sup>3</sup> | 2                                  | 6                    |

Given the proximity of the existing track to an irrigated athletic field, a significant potential exists for some of the pavement supporting soils to be wet and unstable. Furthermore, the supporting soils may exhibit instability when the existing asphalt concrete is removed. If wet or unstable subgrade soils are encountered, they should be addressed using one of the methods outlined in Section 7.6 Wet/Unstable Subgrade Soils.

---

<sup>3</sup> A rubberized or acrylic athletic track surface layer may be placed on top of and in addition to the recommended section.

Base course and asphalt concrete should conform to *MAG (Maricopa Association of Governments) Standard Specifications for Public Improvements*, Current Edition. Bituminous surfacing should be constructed of dense-graded, central plant-mix, asphalt concrete. Asphalt concrete should conform to the specification requirements for “½-inch” Marshall Mix of the MAG specifications. An alternative low-volume asphalt mix that includes terminal rubber binder is also acceptable and may have a better long-term performance for an athletic track.

Material and compaction requirements should conform to recommendations presented under **EARTHWORK**. The gradient of paved surfaces should ensure positive drainage. Water should not pond in areas directly adjoining paved sections. The on-site clayey subgrade soils may soften and lose stability if subjected to conditions that result in an increase in water content.

The "design life" (20 years) of a pavement is defined as the expected life at the end of which reconstruction of the pavement will need to occur. Normal maintenance, including crack sealing, slurry sealing, and/or chip sealing, should be performed during the life of the pavement.

## **7.0 EARTHWORK**

### **7.1 General**

The conclusions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. Any excavating, trenching, or disturbance that occurs after completion of the earthwork must be backfilled, compacted and tested in accordance with the recommendations contained herein. It is not reasonable to rely upon our conclusions and recommendations if any future unobserved and untested trenching, earthwork activities or backfilling occurs.

Although fills or underground facilities such as septic tanks, cesspools, basements, utilities, and dry wells were not observed, such features might be encountered during construction. These features should be demolished in accordance with the recommendations of the geotechnical engineer. Any loose or disturbed soils resulting from demolition should be removed or recompacted as engineered fill and any excavations should be backfilled in accordance with recommendations presented herein.

## **7.2 Site Clearing**

Strip and remove any existing fill material, vegetation, debris, and any other deleterious materials from the building and pavement areas. The building area is defined as that area within the building footprint plus 5 feet beyond the perimeter of that footprint. All exposed surfaces should be free of mounds and depressions that could prevent uniform compaction.

## **7.3 Excavation**

We anticipate that excavations for shallow foundations and utility trenches for the proposed construction can be accomplished with conventional equipment.

On-site soils may pump or become unworkable at high water contents. Workability may be improved by scarifying and drying. Over-excavation of wet zones and replacement with granular materials may be necessary. The use of lightweight excavation and compaction equipment may be required to minimize subgrade pumping.

The soils to be penetrated by the proposed excavations may vary significantly across the site. Our soil classifications are based solely on the materials encountered in widely spaced exploratory test borings. The contractor should verify that similar conditions exist throughout the proposed area of excavation. If different subsurface conditions are found at the time of construction, we should be contacted immediately to evaluate the conditions encountered.

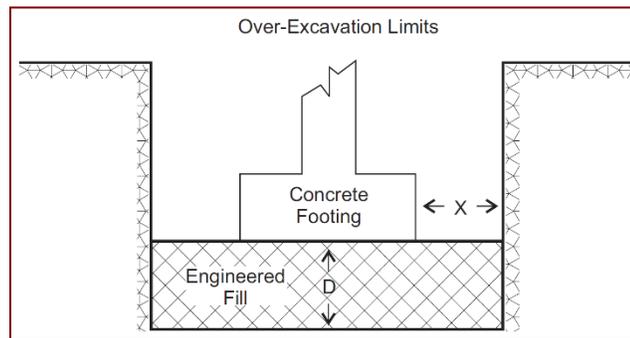
### **7.3.1 Temporary Excavations and Slopes**

Temporary, non-surcharged construction excavations should be sloped or shored. The individual contractor should be made responsible for designing and constructing stable, temporary excavations as required to maintain stability of both the excavation sides and bottom. All excavations should be sloped or shored in the interest of safety following local and federal regulations, including current OSHA excavation and trench safety standards. OSHA recommends a maximum slope inclination of  $\frac{3}{4}$ :1 (horizontal:vertical) for Type A soils, 1:1 for Type B soils, and  $1\frac{1}{2}$ :1 for Type C soils.

As a safety measure, it is recommended that all vehicles and soil piles be kept a minimum lateral distance back from the crest of the slope at least equal to the slope height. The exposed slope face should be protected against the elements.

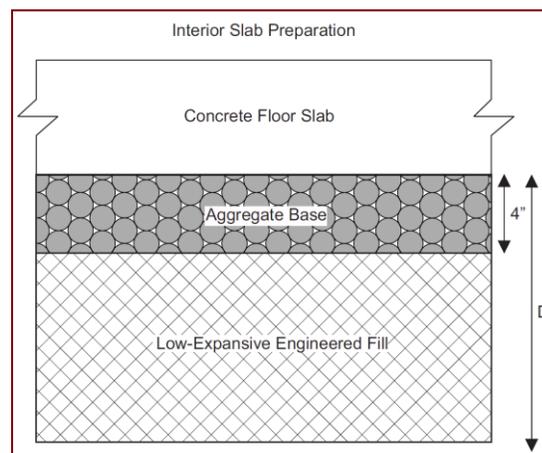
#### 7.4 Foundation Preparation

In footing areas, remove existing soils as required to a minimum depth of 2 feet below the bottom of the footing (depth D in the diagram below) or 2 feet below existing site grade, whichever is deeper. Removal should extend a minimum of 2 feet beyond the footing edges (length X in the diagram below). Replace with engineered fill material.



#### 7.5 Conventional Interior Slab Preparation

Slabs-on-grade should be founded on engineered fill material. Remove existing soils to a minimum depth of 12 inches below the bottom of the slab (depth D in the diagram below). Replace with properly compacted, low- or non-expansive, fill material. The aggregate base course below the slab may be included as part of the low- or non-expansive engineered fill.



#### 7.6 Wet/Unstable Subgrade Soils

If site soils become excessively wet, pumping and instability should be anticipated. If wet, unstable subgrade soils are encountered during construction, there are several alternatives

to mitigate them. The alternatives vary in cost and time to implement, so the alternatives should be evaluated and compared in order to decide which one is most beneficial for the project.

1. The wet, unstable subgrade may be scarified and/or partially removed in order to allow the excess moisture to evaporate. The soils should be periodically blended to allow uniform drying to occur. When the soils are near optimum moisture content, they should be compacted in accordance with project requirements.
2. The wet, unstable subgrade may be removed and replaced with drier, granular soil and/or aggregate base course. The depth of removal necessary will vary depending on the conditions in each unstable area. It may be best to remove a uniform thickness of 2 feet in each area. Although the wet, unstable soils may extend to a depth greater than 2 feet, the granular material should bridge over these deeper wet soils. Removal should be performed with an excavator or similar piece of equipment so that underlying wet soils will not be adversely affected by wheel loads and thereby become more unstable. The first foot of granular backfill should be placed at near-optimum moisture content and compacted using static (non-vibrating) equipment to at least 90 percent of the maximum dry density. The second foot of granular material may then be placed and compacted in accordance with project requirements.
3. Geogrid and aggregate base course may be used to bridge over wet subgrade soils. Wet, unstable subgrade should be removed to a depth of at least 1 foot and to a distance at least 2 feet beyond the edge of the unstable area. Removal should be performed with an excavator or similar piece of equipment so that underlying wet soils will not be adversely affected by wheel loads and thereby become unstable. Geogrid should consist of Tensar Type 3, HX165, NX750 or equivalent and should be installed in accordance with the manufacturer's installation instructions. The geogrid should extend at least 2 feet beyond the edge of the unstable area. Aggregate base course (not just granular soil) should be placed over the geogrid and compacted in accordance with project requirements.
4. Wet, unstable subgrade soils at the site may be mixed with dry portland cement or hydrated lime. For cost-estimating purposes, it may be assumed that 5 percent by dry weight of the soil will be required to stabilize the site soils and that treatment to a depth of 1 foot will be required to bridge over the unstable areas. The depth of treatment and quantity of cement or lime may be modified during

construction depending on the results achieved. It should be noted that the portland cement will not chemically react with the clay component of the soil; however, the cement will dry the soil and will provide cementation of the coarse-grained particles in the soil. Since the dry cement will react with the excess moisture in the subgrade soils, additional water will need to be added to achieve moisture contents near optimum prior to compaction of the soils. The blended soil should be compacted and tested in accordance with project requirements.

The extent of the unstable areas to be treated may be identified by proof rolling the exposed materials with a 20-ton, tandem-axle, dual-wheel water truck or dump truck loaded to the legal limit with tires inflated to 100 psi. Areas where soil movement is observed more than 6 inches away from the truck's rear tires should be considered unstable.

#### **7.7 Athletic Track Pavement Preparation**

It is recommended that the existing asphalt concrete should be removed completely or pulverized on-site. If the asphalt is pulverized, the resulting asphalt concrete millings may be used as part of the aggregate base course below the new pavements. Prior to placement of fill and/or base course or pavement materials the exposed subgrade soils should be proof-rolled and observed by the geotechnical engineer or his qualified representative to verify that stable subgrade conditions exist. The proof-roll should be conducted using a fully loaded, single axle water truck or other vehicle that will provide sufficient weight on the subgrade. Any loose, soft, disturbed, or otherwise unsuitable materials should be over-excavated and replaced with engineered fill.

#### **7.8 Materials**

Clean on-site soils with low expansive potentials and maximum dimension of 6 inches or imported materials may be used as fill material for the following:

- Foundation areas
- Interior slab areas
- Pavement areas
- Backfill

Imported soils should conform to the following:

- Gradation (ASTM C136): percent finer by weight

|                     |          |
|---------------------|----------|
| 6" .....            | 100      |
| 4" .....            | 85-100   |
| ¾" .....            | 70-100   |
| No. 4 Sieve .....   | 50-100   |
| No. 200 Sieve ..... | 40 (max) |
  
- Maximum expansive potential (%)<sup>4</sup>..... 1.5
  
- Maximum soluble sulfates (%).....0.10

Base course should conform to the *Maricopa Association of Governments Uniform Standard Specifications and Details for Public Works Construction* (MAG) or other local government specifications.

**7.9 Placement and Compaction**

- a. Place and compact fill in horizontal lifts, using equipment and procedures that will produce recommended water contents and densities throughout the lift.
  
- b. Uncompacted lift thickness should not exceed 10 inches.
  
- c. Materials should be compacted to the following:

---

<sup>4</sup> Measured on a sample compacted to approximately 95 percent of the ASTM D698 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 100 psf surcharge and submerged.

**Minimum Percent  
Material Compaction (ASTM D698)**

- On-site or imported soil, reworked and fill:
  - Below footings..... 95
  - Below slabs-on-grade..... 95
  - Below pavement ..... 95
  
- Base course below slabs-on-grade and foundations ..... 95
  
- Aggregate base below pavement ..... 95
  
- Nonstructural backfill ..... 90

On-site clayey soils should be compacted within a water content range of 1 percent below to 3 percent above optimum. Imported and on-site granular soils with low expansion potential should be compacted within a water content range of 3 percent below to 3 percent above optimum.

**7.10 Compliance**

Recommendations for foundations, slabs-on-grade, and pavements supported on compacted fills or prepared subgrade depend upon compliance with the **EARTHWORK** recommendations. To assess compliance, observation and testing should be performed under the direction of a WT geotechnical engineer. Please contact us to provide these observation and testing services.

**8.0 ADDITIONAL SERVICES**

The recommendations provided in this report are based on the assumption that a sufficient schedule of tests and observations will be performed during construction to verify compliance. At a minimum, these tests and observations should be comprised of the following:

- Observations and testing during site preparation and earthwork,
- Observation of foundation excavations, and
- Consultation as may be required during construction.

Retaining the geotechnical engineer who developed your report to provide construction observation is the best way to verify compliance and to help you manage the risks associated with unanticipated conditions.

## **9.0 LIMITATIONS**

This report has been prepared assuming the project criteria described in **2.0 PROJECT DESCRIPTION**. If changes in the project criteria occur, or if different subsurface conditions are encountered or become known, the conclusions and recommendations presented herein shall become invalid. In any such event, WT should be contacted in order to assess the effect that such variations may have on our conclusions and recommendations. If WT is not retained for the construction observation and testing services to determine compliance with this report, our professional responsibility is accordingly limited.

The recommendations presented are based entirely upon data derived from a limited number of samples obtained from widely spaced explorations. The attached logs are indicators of subsurface conditions only at the specific locations and times noted. This report assumes the uniformity of the geology and soil structure between explorations, however variations can and often do exist. Whenever any deviation, difference, or change is encountered or becomes known, WT should be contacted.

This report is for the exclusive benefit of our client alone. There are no intended third-party beneficiaries of our contract with the client or this report, and nothing contained in the contract or this report shall create any express or implied contractual or any other relationship with, or claim or cause of action for, any third party against WT.

This report is valid for the earlier of one year from the date of issuance, a change in circumstances, or discovered variations. After expiration, no person or entity shall rely on this report without the express written authorization of WT.

## **10.0 CLOSURE**

We prepared this report as an aid to the designers of the proposed project. The comments, statements, recommendations and conclusions set forth in this report reflect the opinions of the authors. These opinions are based upon data obtained at the location of the explorations, and

from laboratory tests. Work on your project was performed in accordance with generally accepted standards and practices utilized by professionals providing similar services in this locality. No other warranty, express or implied, is made.



**LEGEND**

 APPROXIMATE BORING LOCATION

NOT TO SCALE: FOR REFERENCE ONLY



PROJECT: WILLCOX HIGH SCHOOL  
 WRESTLING ADDITION AND TRACK PAVING  
 JOB NO.: 29-224101-2

PLATE

1

**BORING LOCATION DIAGRAM**

|  |  |
|--|--|
| <b>Allowable Soil Bearing Capacity</b> | The recommended maximum contact stress developed at the interface of the foundation element and the supporting material.   |
| <b>Backfill</b>                        | A specified material placed and compacted in a confined area.  |
| <b>Base Course</b>                     | A layer of specified aggregate material placed on a subgrade or subbase.   |
| <b>Base Course Grade</b>               | Top of base course.  |
| <b>Bench</b>                           | A horizontal surface in a sloped deposit.  |
| <b>Caisson/Drilled Shaft</b>           | A concrete foundation element cast in a circular excavation which may have an enlarged base (or belled caisson).   |
| <b>Concrete Slabs-On-Grade</b>         | A concrete surface layer cast directly upon base course, subbase or subgrade.  |
| <b>Crushed Rock Base Course</b>        | A base course composed of crushed rock of a specified gradation.   |
| <b>Differential Settlement</b>         | Unequal settlement between or within foundation elements of a structure.   |
| <b>Engineered Fill</b>                 | Specified soil or aggregate material placed and compacted to specified density and/or moisture conditions under observations of a representative of a soil engineer.   |
| <b>Existing Fill</b>                   | Materials deposited through the action of man prior to exploration of the site.  |
| <b>Existing Grade</b>                  | The ground surface at the time of field exploration.   |
| <b>Expansive Potential</b>             | The potential of a soil to expand (increase in volume) due to absorption of moisture.  |
| <b>Fill</b>                            | Materials deposited by the actions of man.   |
| <b>Finished Grade</b>                  | The final grade created as a part of the project.  |
| <b>Gravel Base Course</b>              | A base course composed of naturally occurring gravel with a specified gradation.   |
| <b>Heave</b>                           | Upward movement.   |
| <b>Native Grade</b>                    | The naturally occurring ground surface.  |
| <b>Native Soil</b>                     | Naturally occurring on-site soil.  |
| <b>Rock</b>                            | A natural aggregate of mineral grains connected by strong and permanent cohesive forces. Usually requires drilling, wedging, blasting or other methods of extraordinary force for excavation.  |
| <b>Sand and Gravel Base Course</b>     | A base course of sand and gravel of a specified gradation.   |
| <b>Sand Base Course</b>                | A base course composed primarily of sand of a specified gradation.   |
| <b>Scarify</b>                         | To mechanically loosen soil or break down existing soil structure.   |
| <b>Settlement</b>                      | Downward movement.   |
| <b>Soil</b>                            | Any unconsolidated material composed of discrete solid particles, derived from the physical and/or chemical disintegration of vegetable or mineral matter, which can be separated by gentle mechanical means such as agitation in water. |
| <b>Strip</b>                           | To remove from present location.   |
| <b>Subbase</b>                         | A layer of specified material placed to form a layer between the subgrade and base course.   |
| <b>Subbase Grade</b>                   | Top of subbase.  |
| <b>Subgrade</b>                        | Prepared native soil surface.  |

**COARSE-GRAINED SOILS**  
LESS THAN 50% FINES

| GROUP SYMBOLS | DESCRIPTION  | MAJOR DIVISIONS  |
|---------------|--|--|
| <b>GW</b>     | WELL-GRADED GRAVEL OR WELL-GRADED GRAVEL WITH SAND, LESS THAN 5% FINES     | GRAVELS<br>MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE |
| <b>GP</b>     | POORLY-GRADED GRAVEL OR POORLY-GRADED GRAVEL WITH SAND, LESS THAN 5% FINES |  |
| <b>GM</b>     | SILTY GRAVEL OR SILTY GRAVEL WITH SAND, MORE THAN 12% FINES                |  |
| <b>GC</b>     | CLAYEY GRAVEL OR CLAYEY GRAVEL WITH SAND, MORE THAN 12% FINES              |  |
| <b>SW</b>     | WELL-GRADED SAND OR WELL-GRADED SAND WITH GRAVEL, LESS THAN 5% FINES       | SANDS<br>MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE  |
| <b>SP</b>     | POORLY-GRADED SAND OR POORLY-GRADED SAND WITH GRAVEL, LESS THAN 5% FINES   |  |
| <b>SM</b>     | SILTY SAND OR SILTY SAND WITH GRAVEL, MORE THAN 12% FINES                  |  |
| <b>SC</b>     | CLAYEY SAND OR CLAYEY SAND WITH GRAVEL, MORE THAN 12% FINES                |  |

**NOTE:** Coarse-grained soils receive dual symbols if they contain 5% to 12% fines (e.g., SW-SM, GP-GC).

**FINE-GRAINED SOILS**  
MORE THAN 50% FINES

| GROUP SYMBOLS | DESCRIPTION   | MAJOR DIVISIONS                              |
|---------------|---|--|
| <b>ML</b>     | SILT, SILT WITH SAND OR GRAVEL, SANDY SILT, OR GRAVELLY SILT        | SILTS AND CLAYS<br>LIQUID LIMIT LESS THAN 50 |
| <b>CL</b>     | LEAN CLAY OF LOW TO MEDIUM PLASTICITY, SANDY CLAY, OR GRAVELLY CLAY |  |
| <b>OL</b>     | ORGANIC SILT OR ORGANIC CLAY OF LOW TO MEDIUM PLASTICITY            |  |
| <b>MH</b>     | ELASTIC SILT, SANDY ELASTIC SILT, OR GRAVELLY ELASTIC SILT          | SILTS AND CLAYS<br>LIQUID LIMIT MORE THAN 50 |
| <b>CH</b>     | FAT CLAY OF HIGH PLASTICITY, SANDY FAT CLAY, OR GRAVELLY FAT CLAY   |  |
| <b>OH</b>     | ORGANIC SILT OR ORGANIC CLAY OF HIGH PLASTICITY                     |  |
| <b>PT</b>     | PEAT AND OTHER HIGHLY ORGANIC SOILS                                 | HIGHLY ORGANIC SOILS                         |

**NOTE:** Fine-grained soils may receive dual classification based upon plasticity characteristics (e.g. CL-ML).

**SOIL SIZES**

| COMPONENT            | SIZE RANGE       |
|----------------------|------------------|
| BOULDERS             | Above 12 in.     |
| COBBLES              | 3 in. – 12 in.   |
| GRAVEL               | No. 4 – 3 in.    |
| Coarse               | ¾ in. – 3 in.    |
| Fine                 | No. 4 – ¾ in.    |
| SAND                 | No. 200 – No. 4  |
| Coarse               | No. 10 – No. 4   |
| Medium               | No. 40 – No. 10  |
| Fine                 | No. 200 – No. 40 |
| Fines (Silt or Clay) | Below No. 200    |

**NOTE:** Only sizes smaller than three inches are used to classify soils

**CONSISTENCY**

| CLAYS & SILTS | BLOWS PER FOOT |
|---------------|----------------|
| VERY SOFT     | 0 – 2          |
| SOFT          | 3 – 4          |
| FIRM          | 5 – 8          |
| STIFF         | 9 – 15         |
| VERY STIFF    | 16 – 30        |
| HARD          | OVER 30        |

**RELATIVE DENSITY**

| SANDS & GRAVELS | BLOWS PER FOOT |
|-----------------|----------------|
| VERY LOOSE      | 0 – 4          |
| LOOSE           | 5 – 10         |
| MEDIUM DENSE    | 11 – 30        |
| DENSE           | 31 – 50        |
| VERY DENSE      | OVER 50        |

**NOTE:** Number of blows using 140-pound hammer falling 30 inches to drive a 2-inch-OD (1½-inch ID) split-barrel sampler (ASTM D1586).

**PLASTICITY OF FINE GRAINED SOILS**

| PLASTICITY INDEX | TERM        |
|------------------|-------------|
| 0                | NON-PLASTIC |
| 1 – 7            | LOW         |
| 8 – 20           | MEDIUM      |
| Over 20          | HIGH        |

**DEFINITION OF WATER CONTENT**

|               |
|---------------|
| DRY           |
| SLIGHTLY DAMP |
| DAMP          |
| MOIST         |
| WET           |
| SATURATED     |



**METHOD OF CLASSIFICATION**

PLATE

**A-2**

The number shown in "**BORING NO.**" refers to the approximate location of the same number indicated on the "Boring Location Diagram" as positioned in the field by pacing or measurement from property lines and/or existing features, or through the use of Global Positioning System (GPS) devices. The accuracy of GPS devices is somewhat variable.

"**DRILLING TYPE**" refers to the exploratory equipment used in the boring wherein **HSA = hollow stem auger**, and the dimension presented is the outside diameter of the HSA used.

"**N**" in "**BLOW COUNTS**" refers to a 2-inch outside diameter split-barrel sampler driven into the ground with a 140 pound drop-hammer dropped 30 inches repeatedly until a penetration of 18 inches is achieved or until refusal. The number of blows, or "blow count", of the hammer is recorded for each of three 6-inch increments totaling 18 inches. The number of blows required for advancing the sampler for the last 12 inches (2<sup>nd</sup> and 3<sup>rd</sup> increments) is defined as the Standard Penetration Test (SPT) "**N**"-Value. Refusal to penetration is considered more than 50 blows per 6 inches. (Ref. ASTM D1586).

"**R**" in "**BLOW COUNTS**" refers to a 3-inch outside diameter ring-lined split barrel sampler driven into the ground with a 140 pound drop-hammer dropped 30 inches repeatedly until a penetration of 12 inches is achieved or until refusal. The number of blows required to advance the sampler 12 inches is defined as the "**R**" blow count. The "**R**" blow count requires an engineered conversion to an equivalent SPT N-Value. Refusal to penetration is considered more than 50 blows per foot. (Ref. ASTM D3550).

"**CS**" in "**BLOWS/FT.**" refers to a 2½-in. outside diameter California style split-barrel sampler, lined with brass sleeves, driven into the ground with a 140-pound hammer dropped 30 inches repeatedly until a penetration of 18 inches is achieved or until refusal. The number of blows of the hammer is recorded for each of the three 6-inch increments totaling 18 inches. The number of blows required for advancing the sampler for the last 12 inches (2<sup>nd</sup> and 3<sup>rd</sup> increments) is defined as the "**CS**" blow count. The "**CS**" blow count requires an engineered conversion to an equivalent SPT N-Value. Refusal to penetration is considered more than 50 blows for a 6-inch increment. (Ref. ASTM D 3550)

"**SAMPLE TYPE**" refers to the form of sample recovery, in which **N** = Split-barrel sample, **R** = Ring-lined sample, "**CS**" = California style split-barrel sample, **G** = Grab sample, **B** = Bucket sample, **C** = Core sample (ex. diamond bit rock coring).

"**DRY DENSITY (LBS/CU FT)**" refers to the laboratory-determined dry density in pounds per cubic foot. The symbol "**NR**" indicates that no sample was recovered.

"**WATER (MOISTURE) CONTENT**" (% of Dry Wt.) refers to the laboratory-determined water content in percent using the standard test method ASTM D2216.

"**USCS**" refers to the "Unified Soil Classification System" Group Symbol for the soil type as defined by ASTM D2487 and D2488. The soils were classified visually in the field, and where appropriate, classifications were modified by visual examination of samples in the laboratory and/or by appropriate tests.

These notes and boring logs are intended for use in conjunction with the purposes of our services defined in the text. Boring log data should not be construed as part of the construction plans nor as defining construction conditions.

Boring logs depict our interpretations of subsurface conditions at the locations and on the date(s) noted. Variations in subsurface conditions and characteristics may occur between borings. Groundwater levels may fluctuate due to seasonal variations and other factors.

The stratification lines shown on the boring logs represent our interpretation of the approximate boundary between soil or rock types based upon visual field classification at the boring location. The transition between materials is approximate and may be more or less gradual than indicated.



## BORING LOG NOTES

PLATE

**A-3**

**Project: WILLCOX HIGH SCHOOL  
WRESTLING ADDITION  
AND TRACK PAVING**  
Project Number: 29-224101-2

# BORING NO. 1



|   |  |  |
|---|--|--|
| Date(s) Drilled<br><b>8/16/2024</b>                           | Logged By<br><b>T. DOMINGUEZ</b>             | Checked By<br><b>J. HEINECKE</b>                       |
| Drilling Method<br><b>HSA</b>                                 | Drill Bit Size/Type<br><b>7"</b>             | Total Depth of Borehole<br><b>21.5 FT</b>              |
| Drill Rig Type<br><b>CME-75</b>                               | Drilling Contractor<br><b>GSI</b>            | Approximate Surface Elevation<br><b>NOT DETERMINED</b> |
| Groundwater Level and Date Measured<br><b>NOT ENCOUNTERED</b> | Sampling Method(s)<br><b>Bulk, Ring, SPT</b> | Hammer Data<br><b>140-LB AUTOHAMMER</b>                |
| Borehole Backfill<br><b>AUGER CUTTINGS</b>                    | Location<br><b>SEE LOCATION DIAGRAM</b>      |  |

| DEPTH (FEET) | MOISTURE CONTENT | DRY DENSITY (LBS/CU FT) | SAMPLE TYPE | SAMPLE | BLOW COUNTS    | USCS  | GRAPHIC | SOIL DESCRIPTION                                | REMARKS AND OTHER TESTS |
|--------------|------------------|-------------------------|-------------|--------|----------------|-------|---------|---|-------------------------|
| 0            |                  |                         | G           |        |                | SC    |         | Clayey SAND; gray-brown, medium dense, moist    |                         |
| 22.9         | 82               |                         | R           |        | 35             |       |         |   |                         |
| 5            | 24.3             | 99                      | R           |        | 29             |       |         |   |                         |
| 10           |                  |                         | N           |        | 18<br>13<br>18 |       |         | becomes brown, dense                            |                         |
| 15           |                  |                         | N           |        | 4<br>4<br>6    | CL    |         | Sandy CLAY; light brown, stiff, moist           |                         |
| 20           |                  |                         | N           |        | 7<br>10<br>8   | CL-ML |         | Sandy Silty CLAY; gray-brown, very stiff, moist |                         |
| 21.5         |                  |                         |             |        |                |       |         | BORING STOPPED AT 21.5 FEET                     |                         |

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**Project: WILLCOX HIGH SCHOOL  
WRESTLING ADDITION  
AND TRACK PAVING**  
Project Number: 29-224101-2

# BORING NO. 2



|   |   |  |
|---|---|--|
| Date(s) Drilled<br><b>8/16/2024</b>                           | Logged By<br><b>T. DOMINGUEZ</b>        | Checked By<br><b>J. HEINECKE</b>                       |
| Drilling Method<br><b>HSA</b>                                 | Drill Bit Size/Type<br><b>7"</b>        | Total Depth of Borehole<br><b>5 FT</b>                 |
| Drill Rig Type<br><b>CME-75</b>                               | Drilling Contractor<br><b>GSI</b>       | Approximate Surface Elevation<br><b>NOT DETERMINED</b> |
| Groundwater Level and Date Measured<br><b>NOT ENCOUNTERED</b> | Sampling Method(s)                      | Hammer Data<br><b>140-LB AUTOHAMMER</b>                |
| Borehole Backfill<br><b>AUGER CUTTINGS</b>                    | Location<br><b>SEE LOCATION DIAGRAM</b> |  |

| DEPTH (FEET) | MOISTURE CONTENT | DRY DENSITY (LBS/CU FT) | SAMPLE TYPE | SAMPLE  | BLOW COUNTS | USCS       | GRAPHIC   | SOIL DESCRIPTION   | REMARKS AND OTHER TESTS |
|--------------|------------------|-------------------------|-------------|---|-------------|------------|---|--|-------------------------|
| 0            |                  |                         |             |   |             | Asphalt SC |  | 1-1/2" Asphalt Concrete on 0" Aggregate Base Course            |                         |
|              |                  |                         | G           |  |             |            |  | Clayey SAND; with gravel, dark gray-brown, medium dense, moist |                         |
| 5            |                  |                         |             |   |             |            |   | BORING STOPPED AT 5 FEET                                       |                         |
| 10           |                  |                         |             |   |             |            |   |  |                         |
| 15           |                  |                         |             |   |             |            |   |  |                         |
| 20           |                  |                         |             |   |             |            |   |  |                         |
| 25           |                  |                         |             |   |             |            |   |  |                         |

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|   |                       |   |
|---|-----------------------|---|
| <b>Project: WILLCOX HIGH SCHOOL<br/>WRESTLING ADDITION<br/>AND TRACK PAVING</b><br><b>Project Number: 29-224101-2</b> | <h1>BORING NO. 3</h1> | <br><b>Western Technologies</b><br><small>An RMA Company</small> |
|---|-----------------------|---|

|  |                                      |   |
|--|--------------------------------------|---|
| Date(s) Drilled <b>8/16/2024</b>                           | Logged By <b>T. DOMINGUEZ</b>        | Checked By <b>J. HEINECKE</b>                       |
| Drilling Method <b>HSA</b>                                 | Drill Bit Size/Type <b>7"</b>        | Total Depth of Borehole <b>5 FT</b>                 |
| Drill Rig Type <b>CME-75</b>                               | Drilling Contractor <b>GSI</b>       | Approximate Surface Elevation <b>NOT DETERMINED</b> |
| Groundwater Level and Date Measured <b>NOT ENCOUNTERED</b> | Sampling Method(s)                   | Hammer Data <b>140-LB AUTOHAMMER</b>                |
| Borehole Backfill <b>AUGER CUTTINGS</b>                    | Location <b>SEE LOCATION DIAGRAM</b> |   |

| DEPTH (FEET) | MOISTURE CONTENT | DRY DENSITY (LBS/CU FT) | SAMPLE TYPE | SAMPLE  | BLOW COUNTS | USCS       | GRAPHIC   | SOIL DESCRIPTION  | REMARKS AND OTHER TESTS |
|--------------|------------------|-------------------------|-------------|---|-------------|------------|---|---|-------------------------|
| 0            |                  |                         | G           |  |             | Asphalt SC |  | 2" Asphalt Concrete on 0" Aggregate Base Course<br>Clayey SAND; trace gravel, gray-brown, medium dense, moist |                         |
| 5            |                  |                         |             |   |             |            |   | BORING STOPPED AT 5 FEET  |                         |
| 10           |                  |                         |             |   |             |            |   |   |                         |
| 15           |                  |                         |             |   |             |            |   |   |                         |
| 20           |                  |                         |             |   |             |            |   |   |                         |
| 25           |                  |                         |             |   |             |            |   |   |                         |

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**Project: WILLCOX HIGH SCHOOL  
WRESTLING ADDITION  
AND TRACK PAVING**  
Project Number: 29-224101-2

# BORING NO. 4



|   |  |  |
|---|--|--|
| Date(s) Drilled<br><b>8/16/2024</b>                           | Logged By<br><b>T. DOMINGUEZ</b>         | Checked By<br><b>J. HEINECKE</b>                       |
| Drilling Method<br><b>HAND EQUIPMENT</b>                      | Drill Bit Size/Type<br><b>HAND AUGER</b> | Total Depth of Borehole<br><b>2 FT</b>                 |
| Drill Rig Type<br><b>CME-75</b>                               | Drilling Contractor<br><b>GSI</b>        | Approximate Surface Elevation<br><b>NOT DETERMINED</b> |
| Groundwater Level and Date Measured<br><b>NOT ENCOUNTERED</b> | Sampling Method(s)<br><b>Bulk</b>        | Hammer Data<br><b>140-LB AUTOHAMMER</b>                |
| Borehole Backfill<br><b>EXCAVATED SOILS</b>                   | Location<br><b>SEE LOCATION DIAGRAM</b>  |  |

| DEPTH (FEET) | MOISTURE CONTENT | DRY DENSITY (LBS/CU FT) | SAMPLE TYPE | SAMPLE | BLOW COUNTS | USCS | GRAPHIC | SOIL DESCRIPTION                        | REMARKS AND OTHER TESTS |
|--------------|------------------|-------------------------|-------------|--------|-------------|------|---------|---|-------------------------|
| 0            |                  |                         | G           |        |             | SC   |         | Clayey SAND; brown, medium dense, moist |                         |
|              |                  |                         |             |        |             |      |         | BORING STOPPED AT 2 FEET                |                         |
| 5            |                  |                         |             |        |             |      |         |   |                         |
| 10           |                  |                         |             |        |             |      |         |   |                         |
| 15           |                  |                         |             |        |             |      |         |   |                         |
| 20           |                  |                         |             |        |             |      |         |   |                         |
| 25           |                  |                         |             |        |             |      |         |   |                         |

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| Boring No. | Sample Depth (ft) | USCS Class. | Percent Passing #200 | Atterberg Limits |    | Initial Dry Density (pcf) | Initial Water Content (%) | Compression Properties |                       |                  | Moisture-Density Relationship |                              |        | Expansion Properties |               |                      | Soluble Sulfates (ppm) | Soluble Chlorides (ppm) | Remarks |
|------------|-------------------|-------------|----------------------|------------------|----|---------------------------|---------------------------|------------------------|-----------------------|------------------|-------------------------------|------------------------------|--------|----------------------|---------------|----------------------|------------------------|-------------------------|---------|
|            |                   |             |                      | LL               | PI |                           |                           | Surcharge (ksf)        | Total Compression (%) |                  | Maximum Dry Density (pcf)     | Optimum Moisture Content (%) | Method | Surcharge (ksf)      | Expansion (%) | Expansion Index (EI) |                        |                         |         |
|            |                   |             |                      |                  |    |                           |                           |                        | In-Situ               | After Saturation |                               |                              |        |                      |               |                      |                        |                         |         |
| 1          | 0-5               | SC          | 35                   | 27               | 11 | 105.2                     | 12.0                      |                        |                       |                  | 113.1                         | 12.9                         | A      | 0.1                  | 1.2           |                      |                        | 1,2,10,12               |         |
| 1          | 2-3               | SC          |                      |                  |    | 82                        | 22.9                      | 1.0                    | 1.6                   |                  |                               |                              |        |                      |               |                      |                        | 2                       |         |
|            |                   |             |                      |                  |    |                           |                           | 2.0                    | 2.3                   | 2.9              |                               |                              |        |                      |               |                      |                        | 2                       |         |
|            |                   |             |                      |                  |    |                           |                           | 4.0                    |                       | 4.5              |                               |                              |        |                      |               |                      |                        | 11                      |         |
| 1          | 5-6               | SC          |                      |                  |    | 99                        | 24.3                      |                        |                       |                  |                               |                              |        |                      |               |                      |                        | 12                      |         |
| 2          | 0-5               | SC          | 23                   | 43               | 29 |                           |                           |                        |                       |                  |                               |                              |        |                      |               |                      |                        | 12                      |         |
| 3          | 0-5               | SC          | 37                   | 38               | 24 |                           |                           |                        |                       |                  |                               |                              |        |                      |               |                      |                        | 12                      |         |

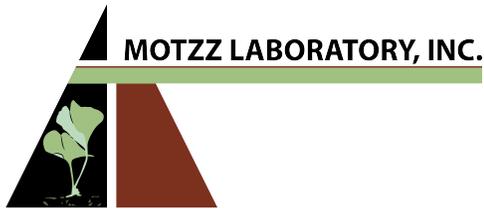
**Remarks**

1. Compacted density is approximately 95% of ASTM D698 maximum density at a moisture content slightly below optimum.  
2. Submerged to approximate saturation.  
3. Slight rebound after saturation.  
4. Sample disturbance observed.  
5. Expansion Index (EI) test in accordance with ASTM D4829.

6. Chloride (ARIZ 736a) by Motzz Laboratory Inc.  
7. Sulfate (ARIZ 733a) by Motzz Laboratory Inc.  
8. pH (ARIZ 237b).  
9. Minimum Resistivity (ARIZ 236c).  
10. Test Method ASTM D698 / AASHTO T99.  
11. Field Visual Classification (ASTM D 2488).

12. Laboratory Soil Classification (ASTM D 2487).  
13. Test Method ASTM D1557 / AASHTO T180.  
14. From the ADOT Family of Curves for Maricopa County.  
15. See Corrosion Plate.  
16. Initial Dry Density and Initial Water Content from Remolded Swell.  
**Notes:** Initial Dry Density and Initial Water Content are in-situ values unless otherwise noted.  
NP = Non-Plastic    NV = No Value

|   |  |              |
|---|--|--------------|
|  | PROJECT: <b>WILLCOX HIGH SCHOOL WRESTLING BUILDING ADDITION AND TRACK PAVING</b> | <b>PLATE</b> |
|   | JOB NO.: <b>29-224101-2</b>  |              |
| <b>SOIL PROPERTIES</b>  |  | <b>B-1</b>   |



Report: 952285  
 Reported: 9/5/2024  
 Received: 8/28/2024  
 PO: 292241010

## Laboratory Analysis Report

Western Technology, Inc - Tucson  
 Justin Heinecke  
 3480 S. Dodge Blvd  
 Tucson, AZ 85713

Project: 29-224101-0

| Lab Number | Sample ID | Crop Info |
|------------|-----------|-----------|
| 952285-1   | 4 (0-2')  | Landscape |

### Soil Complete Test

| <i>Test</i>                 | <i>Method</i>   | <i>Result</i> | <i>Units</i> | <i>Levels</i> |
|-----------------------------|-----------------|---------------|--------------|---------------|
| pH                          | 1:1             | 8.3           | SU           | High          |
| Electrical Conductivity, EC | 1:1             | 0.50          | dS/m         | Medium        |
| Calcium, Ca                 | NH4OAc (pH 8.5) | 2500          | ppm          | High          |
| Magnesium, Mg               | NH4OAc (pH 8.5) | 210           | ppm          | High          |
| Sodium, Na                  | NH4OAc (pH 8.5) | 390           | ppm          | Very High     |
| Potassium, K                | NH4OAc (pH 8.5) | 220           | ppm          | Medium        |
| Zinc, Zn                    | DTPA            | 0.39          | ppm          | Low           |
| Iron, Fe                    | DTPA            | 8.3           | ppm          | High          |
| Manganese, Mn               | DTPA            | 6.6           | ppm          | Medium        |
| Copper, Cu                  | DTPA            | 0.82          | ppm          | High          |
| Nickel, Ni                  | DTPA            | 0.22          | ppm          |               |
| Nitrate-N, NO3-N            | Cd-Reduction    | 2.3           | ppm          | Low           |
| Phosphate-P, PO4-P          | Olsen           | 9.0           | ppm          | Low           |
| Sulfate-S, SO4-S            | Hot Water       | 18            | ppm          | High          |
| Boron, B                    | Hot Water       | 1.5           | ppm          | Medium        |
| Free Lime, FL               | Acid Test       | High          |              |               |
| ESP                         | Calculated      | 10.3          | %            |               |
| CEC                         | Calculated      | 16.5          | meq/100g     |               |

Victoria Normandin, LLC  
Email: [vicn@cox.net](mailto:vicn@cox.net)  
602-799-7248

Date: 9/07/2024

Report:952285

Information provided by the laboratory: Landscape.

The pH of soil is on the high side at 8.3.

EC or soluble salt is moderately at .5 dS/m.

Till in or topically apply 10 lbs. Sulfur/1000 sq.ft. to lower pH. After applying sulfur, irrigate heavily.

Nitrate-N is very low, and Phosphate-P is moderately low. Apply 1.0-1.5 lb. N/1000 sq.ft. and 1 lb.

P<sub>2</sub>O<sub>5</sub>/1000 sq.ft. Potassium is adequate but an additional 1 lb. K<sub>2</sub>O/1000 sq.ft. can be applied if using an N-P-K fertilizer.

The Ca:Mg ratio is OK at 11:1.

Micronutrients, Fe, Zn, Mn, Cu, B, are adequate and in good proportion to each other. Zinc is on the low side. Lowering pH with Sulfur will help increase the availability of zinc. Also, a blended fertilizer that contains a minor amount of zinc can be used.

Thank you,



Victoria Normandin, CPAg

Note: Soil Nutrient interpretations and recommendations are based on the Soil Complete/Standard Analysis Report provided Motzz Laboratory.