– HERRIMAN CITY –

2019 New Restroom Facilities

January 21, 2019

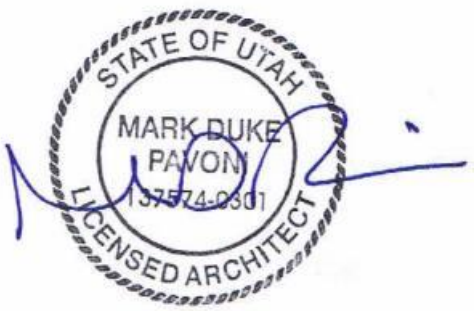
HERRIMAN
CITY

– Herriman City –

2019 New Restroom Facilities

CONTRACT DOCUMENTS

January 21, 2019



Prepared For:

HERRIMAN CITY
5355 West Herriman Main Street
Herriman, Utah 84096

Prepared By:

SH ARCHITECTURE
868 S. McClelland St., Suite 2
Salt Lake City, Utah 84102

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PART 1 GENERAL

1.1 CONSTRUCTION CONTRACTOR QUALIFICATION

A. Herriman City will only consider bids for award of this road contract from contractors who have performed the construction work on five similar projects since the year 2013.

B. Those references or contact information for each of those project owners shall be included in the bid.

1.2 CONSTRUCTION CONTRACT

A. Bidders are invited to bid on the Construction Contract known as

2019 New restroom Facilities

B. The location of the work is in Herriman City at the following sites:

6018 W. Heritage Hill Drive	***13912 S. 7300 W***	***12101 S. Tower Arch Ln.***
Herriman, Utah 84096	***Herriman, Utah 84096***	***Herriman, Utah 84096***

C. The work to be performed consists of furnishing and installing the equipment, facilities, services and appurtenances thereto as included in the Contract Documents. The Work generally includes, but is not limited to, the following:

The project shall be an approximately 302 square foot stand-alone single-story building consisting of two single-occupant restrooms and an associated utility room. Construction shall include unit masonry (structural and facing), rough carpentry, metal roof systems and accessories, doors and hardware, painting and special coatings, toilet room accessories, plumbing fixtures, minimal mechanical systems, electrical (power and lighting), and exterior improvements, such as concrete sidewalks.

D. Meet all specific requirements of the plans and instructions included in this document.

E. For information about the award of this Construction Contract, contact ***Mr. Blake Thomas, Herriman City Project Engineer, 5355 West Herriman Main Street, Herriman, Utah 84096, (801) 446-5323, email bthomas@herriman.org.***

1.3 BID LOCATION AND OPENING

A. Separate sealed bids for the construction of the Herriman City [OWNER], ***2019 New Restroom Facilities*** will be received at the Herriman City Hall located at 5355 West Herriman Main Street, Herriman, Utah, 84096 ***until 3:00 PM local***

standard time, on February 7, 2019, and then publicly opened and read aloud at the Herriman City Hall. All bids must be addressed Attn: Herriman City Engineer with the name ***Herriman City 2019 New Restroom Facilities*** clearly marked. All bids will be time and date stamped and only the bids received in the time period specified above will be accepted (local prevailing time, as conclusively established by the clock at the Bid opening location). All bids must be in writing and in conformity with the City's purchasing policy. Bids received after said date and time will not be accepted.

B. On the outside of the envelope, the bidder shall indicate the Construction Contract title, the name and address of the Bidder, and the date and time of Bid opening and the Bidder's return mailing address.

1.4 BID SECURITY

A. Bid security in the amount of 5% (five percent) of the Bid must accompany each Bid in accordance with the Instructions to Bidders. Bid Security will be returned to each unsuccessful Bidder after tabulation and award of the Construction Contract.

1.5 CONTRACT TIME

A. ***The Work will be substantially Completed and ready for operation in 120 calendar days after the date when the Contract Times commence to run.***

1.6 EXAMINATION AND PROCUREMENT OF DOCUMENTS

A. Complete sets of contract documents may be examined and obtained from the OWNER from the Utah Procurement Place website by clicking on "For Vendors" at http://purchasing.utah.gov/. These documents will be made available on the website on January 21st, 2019 at 10:00 am.

1.7 RIGHT TO REJECT BIDS

A. The OWNER reserves the right to reject any or all bids or to waive any informality or technicality in any bid if deemed to be in the best interest of the OWNER.

1.8 VALIDITY PERIOD FOR BIDS

A. Bids shall remain valid for 30 days after the day of Bid opening. Bidders who withdraw their bid after Bid opening, but before expiration of said period, shall forfeit their bid security if Notice of Intent to Award to the successful Bidder is made by OWNER.

1.9 BASIS OF BIDS

A. Bids shall be on a unit price/lump-sum basis. Unsealed or segregated Bids will not be accepted.

1.10 PRE-BID CONFERENCE

A. ***A mandatory Pre-Bid Meeting, open to all interested parties, will be held on January 31, 2019 at 1:00 PM beginning at Herriman City Hall.***

1.11 **GOVERNING LAWS AND REGULATIONS**

A. This project is not federally funded and does not require the payment of specific wage rates. Payroll submittal will not be required.

B. Bidders on this Work will be subject to the applicable provisions of all federal rules, laws and regulations or orders.

C. In compliance with Americans with Disabilities Act, (ADA) the following information is provided: contact person: **Delinda Bodrero, dbodrero@herriman.org, Engineering Department.**

First Publication: _____ Second Publication: _____

END OF DOCUMENT

DOCUMENT 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 GENERAL

1.1 DESCRIPTION OF THE WORK

A. The Work to be performed consists of furnishing and installing the equipment, facilities, services, and appurtenances thereto as included in the Contract Documents. A general description of the Work is set forth in the Invitation to Bid (Document 00 11 16).

B. General Conditions: as published in Document 00 72 00 in the Manual of Standard Specifications by the Utah Chapter of the American Public Works Association 2017 Edition.

1.2 COPIES OF BID DOCUMENTS

A. Bidders must use complete sets of Bid Documents in preparing Bids. OWNER maintains a complete set on file at the address set forth in the Invitation to Bid, and bidders may review the file copy upon request during regular business hours. Bidders are solely responsible to verify whether their sets of Bid Documents are complete.

B. Bid Documents are made available to bidders only for the purpose of obtaining Bids on the Work. No license or grant for any other use is given.

C. Bidding Document copyrights shall remain with either the OWNER or ENGINEER.

D. All provisions of the Manual of Standard Specifications, 2017 Edition published by the Utah Chapter of the American Public Works Association that are applicable to the Work are hereby made a part of the Contract Documents by reference. The publications may be purchased separately from the Utah LTAP Center, Utah State University 4111 Old Main Hill, Logan UT 84322-4111.

1.3 PRE-BID CONFERENCE

A. If a pre-bid conference is held, the time, place and nature of the conference will be stated in the Invitation to Bid. Representatives of OWNER and ENGINEER will be present to discuss the Project. The OWNER shall not be bound by any statements, representations, conclusions, or assumptions made by any party, whether oral or written, except for written statements that are issued in an Addendum by the ENGINEER to all prospective bidders.

1.4 PHYSICAL CONDITIONS

A. **In General**: Prior to submitting a Bid, each Bidder is responsible to review all available explorations, tests and data concerning surface conditions, subsurface conditions and Underground Facilities at or contiguous to the site, or otherwise, which may affect cost, progress, performance or furnishing of the Work in accordance with the time, price and other terms and conditions of the Contract Documents.

B. **Surface and Subsurface Conditions**: Provisions concerning surface and subsurface conditions, if any, are set forth in a document titled Geotechnical Data (Document 00 31 32). The document provides the identification of:

1. Those reports of explorations and tests of subsurface conditions at the site which have been utilized in preparing the Contract Documents; and

2. Those drawings of physical conditions in or relating to existing surface and subsurface structures (except Underground Facilities) which are at or contiguous to the site which have been utilized in preparing the Contract Documents.

C. **Underground Facilities**: Information and data indicated in the Contract Documents regarding Underground Facilities at or contiguous to the site is based upon information and data furnished to OWNER and ENGINEER by owners of such Underground Facilities. The OWNER does not assume responsibility for the accuracy or completeness thereof other than as provided in paragraph 4.3A.2 of the General Conditions or unless expressly provided in the Modifications to General Conditions (Document 00 73 00).

D. **Additional Explorations and Tests**: If feasible as determined by OWNER, the OWNER will provide each Bidder access to the site to conduct any explorations and tests as each Bidder deems necessary for submission of a Bid. Bidder shall obtain permits, fill all holes, clean up and restore the site to its former condition upon completion of such explorations. By requesting such an exploration or test, Bidder agrees to release, indemnify, defend, and save the OWNER harmless from all costs damages and liabilities an any kind whatsoever, including reasonable attorneys' fees, that may arise in connection with or as a result of the performance of such explorations or tests.

1.5 COMPENSATION AND QUANTITIES

A. **In General**: The bid price for any lump sum or unit price contract includes all labor, materials, and incidental work to fully complete the Work in a satisfactory manner under the terms of the Contract Documents. Bidders are responsible to inform themselves of the character of the Work to be performed.

B. **Lump Sum Work**: If the Work is to be paid for on a lump sum basis, the lump sum will be the only sum paid.

C. **Unit Price Work**: If any portion of the Work is to be paid for on a unit price basis, payment will cover only work actually performed and materials actually supplied at the unit prices bid and on the terms set forth in the Contract Documents, irrespective of any quantity approximations in the Bid Documents. Any quantity approximations in the Bid Documents are stated as a basis for determining bids, and they do not fix the amount of Work to be done or materials to be furnished. Stated quantities are estimates for the purpose of doing the class of work required. Actual quantities will vary. The OWNER may deviate in either direction from any indicated quantities. The Bidder shall have no claim for any variation in quantity, except to the extent permitted in the General Conditions.

1.6 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

A. **In General**: The OWNER shall not be bound by any statements, representations, conclusions, or assumptions made by any party, whether oral or written, except for written statements that are issued in an Addendum.

B. **Access**: The Contract Documents designate the site for performance of the Work. Bidder is responsible to investigate the site and understand all access requirements. All additional off site lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Bidder.

C. **Bidder's Obligations**: In addition to Bidder's other responsibilities and obligations in connection with submitting a Bid, it is the responsibility of the Bidder before submitting a Bid, to:

1. Examine the Contract Documents thoroughly;

2. Visit the site to become familiar with local conditions that may affect cost, progress, performance or furnishing of the Work;

3. Investigate all applicable construction and labor conditions, quantities, and the character of the Work as they affect cost, progress, performance, or furnishing of the Work;

4. Consider federal, state and local Laws and Regulations that may affect cost, progress, performance or furnishing of the Work;

5. Study and carefully correlate Bidder's observations with the Contract Documents;

6. Attend any pre-bid conference, which shall be mandatory if so designated in the Invitation to Bid;

7. Review all available explorations and data concerning surface and subsurface conditions as set forth in Section 1.4 above; and

8. Identify and notify ENGINEER in writing in the manner set forth in article 2.1 below of all specific conflicts, omissions, errors, or discrepancies in the Contract Documents, or if Bidder doubts their meanings.

The failure or omission of any Bidder to take any of the foregoing actions shall not in any way relieve Bidder of its Bid, or its obligation to furnish all material, equipment, labor and services necessary to carry out the provisions of the Contract Documents and to complete the contemplated Work for the consideration set forth in its Bid. Submission of a Bid shall constitute prima facie evidence of compliance with these instructions.

D. **Deviations from the Terms of the Contract Documents**: OWNER will not accept any deviations whatsoever from the printed terms of the Agreement and the Contract Documents, except by Addendum or Change Order.

1.7 EFFECT OF SUBMITTING A BID

A. Bidders are responsible to carefully examine the Contract Documents, visit the site, and fully inform themselves so as to include in the Bid a sum to cover the cost of all items. Bidder's failure or omission to receive or examine any form, instrument, addendum or other document, visit the site and become acquainted with existing conditions, or attend any pre-Bid Conference, shall in no way relieve Bidder from any obligations with respect to Bidder's Bid or the Construction Contract.

B. By submitting a Bid, Bidder represents that Bidder has complied with all requirements of the Bid Documents; that the Bid is premised on properly performing and furnishing the Work required by the Contract Documents within the times specified; that the Bidder is informed of the conditions to be encountered and the character, quality and quantities of the Work; and that the Bidder believes the Contract Documents are sufficient in scope and detail to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

C. Submission of a Bid constitutes a promise that the Bidder will enter the Contract Documents in the form presented in the Contract Documents. Bidders should carefully examine all Contract Documents, including the required Bonds and insurance to be provided by the Bidder.

1. The Performance Bond is a guarantee of faithful performance of the requirements of the Contract Documents, including all applicable warranties. The Payment Bond is a guarantee of payment of all labor, materials, or supplies used directly or indirectly in the prosecution of the Work provided in the Construction Documents.

2. The sum of the Performance Bond and the Payment Bond shall be increased or decreased during the course of the Work in the event that Contract Modifications, Change Orders or Addenda increase or decrease the total contract price. The sum of each bond shall be in an amount equal to the completed contract price at the completion of the Work.

3. OWNER does not provide any release of Performance Bonds or Payment Bonds. The bonds are in effect throughout all periods during which a suit may be brought under the provisions of applicable law.

D. By submitting a Bid, Bidder represents that the matters stated therein are true and correct.

PART 2 BIDDING PROCEDURES

2.1 INTERPRETATIONS AND ADDENDA

A. All requests for interpretation of the Contract Documents shall be made in writing and delivered to the OWNER or ENGINEER no later than seven (7) calendar days prior to opening of Bids. In the OWNER's or ENGINEER's discretion, OWNER or ENGINEER will send the written interpretation to all persons receiving a set of Bid Documents in the form of an Addendum. If the OWNER or ENGINEER does not respond to a Bidder's request for interpretation the Bidder shall comply with the intent and terms of the Contract Documents.

B. No oral interpretations shall be made to any Bidder. The OWNER shall not be responsible for or bound by any statements, interpretations, explanations, representations, conclusions or assumptions made by any party, whether oral or written, except for written statements that are issued in an Addendum by the ENGINEER to all prospective bidders.

C. Each statement made in an Addendum is part of the Contract Documents at the location designated in the Addendum. A statement issued in an Addendum shall have the effect of modifying a portion of the Bid Documents when the statement in the Addendum specifies a particular section, paragraph or text and states that it is to be so modified. Only the specified section, paragraph or text shall be so modified, and all other portions of the Bid Documents shall remain in effect.

D. Bidders shall acknowledge receipt of all Addenda in the space provided on the Bid Form.

E. Except to postpone the Bid opening, no Addenda shall be issued within 48 hours of the Bid opening.

2.2 EQUIPMENT AND MATERIAL OPTIONS PRIOR TO BID OPENING

A. If a Bidder or Supplier wishes to supply a product other than that identified in the Contract Documents, said Bidder or Supplier shall submit a written request for approval to the OWNER or ENGINEER at least ten (10) calendar days prior to the date set for opening of bids.

B. The procedure for submission of any such product option shall be as set forth in Article 6.4 of the General Conditions. It is the sole responsibility of the Bidder or Supplier to submit complete descriptive and technical information so that OWNER or ENGINEER can make a proper appraisal.

C. OWNER or ENGINEER's failure to act upon such a request within five (5) days after receipt shall be deemed a denial thereof.

D. Any such approval is at the sole discretion of the OWNER or ENGINEER and will be in the form of an Addendum issued to all Bidder's holding Bid Documents indicating that the additional equipment or materials are approved as equal to those specified for the Project.

E. The Construction Contract, if awarded, will be on the basis of materials and equipment specified in the Drawings and Specifications and any changes permitted in any Addenda.

2.3 BID SECURITY

A. **Amount of Bid Security**: A Bid Security must accompany each Bid. The total amount of the Bid on which Bid security is to be based shall be the sum of all items of the Bid constituting the maximum amount of the possible award to the Bidder. The Bid Security amount must equal at least five (5) percent of the total amount of the Bid.

B. **Form of Bid Security**: The Bid Security may be in the form of a certified check, cashier's check, cash, or Bid Bond. No other form of Bid Security will be accepted. A Bid Bond must be issued by a licensed Utah agency on behalf of a surety company licensed to do business in the State of Utah. A cashier's check must be drawn on a bank doing business in the State of Utah and made payable to OWNER. If a cashier's check is used in lieu of a Bid Bond, or if the Bid Bond does not specifically so provide, a certificate from an approved surety company

guaranteeing execution of performance and payment bonds in the full amount of the bid must accompany the bid.

C. **Purpose of Submission**. By submitting a Bid Bond Bidder assures OWNER it will take all steps necessary to properly execute the Contract Documents.

D. **Return of Bid Security**: OWNER will return Bid securities to Bidder within seven (7) days after award of the Construction Contract. Bid Bonds and cashier's checks of all Bidders will be held until the Construction Contract is awarded or all bids have been rejected. The liability of OWNER in regards to the checks shall be limited only to the return of the checks.

E. **Default**: In the event of failure or refusal of the Bidder to timely provide subcontractors and suppliers reports as provided herein or to enter into the Construction Contract and the delivery to the OWNER a Performance Bond, Payment Bond and any other Bonds or documents required by the Contract Documents after Notice of Award by the OWNER, the Bidder forfeits the sum of the Bid Bond or cashier's check as liquidated damages to the OWNER.

2.4 COMPLETING BID DOCUMENTS

A. The General Conditions identify all forms comprising the Bid Documents. Additional copies may be obtained from the OWNER or ENGINEER. The Bidder shall make no stipulations or alterations on the Bid forms. The Bidder must use and execute only the Bid Form and Bid Schedules provided in the Contract Documents. The Bidder shall complete and submit the separate, unbound Bid Form, Document 00 41 43 and the Bid Bond, Document 00 43 13 provided.

B. The Bidder must fill in all items in the Bid Form in ink or by typewriter. If applicable, furnish both the unit and total costs for each item. The total Bid price is the full price for the performance of all Work under the Contract Documents. Bidder shall initial in ink any corrections, interlineations, alterations, or erasures made by the Bidder on Bidder's entries in the Bid Documents.

C. Any work or material which is specified in the Contract Documents or which is necessary because of the nature of the Work, but which is not listed separately in the Bid Schedule shall not be measured or paid for separately. The cost of such work or material shall be considered as included in the Contract Price.

D. Bids by corporations must be executed in the corporate name by a corporate officer authorized to sign, and must be properly attested to as an official act of the corporation. At the OWNER's request, authority to sign shall be submitted.

E. Bids by partnerships, joint ventures, or limited liability companies must be executed in the partnership, joint venture, or limited liability company name and signed by a partner, joint venturer, or manager whose title and official address must be shown.

If a partnership, joint venture, or limited liability company is the low bidder, the partnership, joint venture, or limited liability company must also submit evidence to the OWNER of the responsibility of the partnership, joint venture, or limited liability company as a bidder in the manner directed by the ENGINEER.

F. Where the Bidder is wholly owned subsidiary of another company, the Bid must so state, and the owner or parent corporation also must agree to sign and be bound with the Bidder.

G. All names must be typed or printed under or near the signature. Signatures shall be in longhand.

H. The Bid shall contain an acknowledgment of receipt of all Addenda. The Addenda numbers must be filled in on the Bid Form.

I. The Bidder's address, telephone number, and facsimile number for communications regarding the Bid must be shown on the first page of the Bid Form.

J. The divisions and sections of the specifications, and the identifications of any Drawings, shall not control Bidder in dividing the Work among subcontractors or suppliers, or delineating the Work to be performed by any specific trade.

K. The base Bid and alternates shall include all Work required to be performed by the Contract Documents.

2.5 CONFLICT OF INTEREST, SUBCONTRACTORS

A. Conflict of interest pertaining to Subcontractors is described in paragraph 6.5H of the General Conditions.

B. Bidder shall not subcontract more than 50 percent of the dollar value of the total contemplated Work (exclusive of the supply of materials and equipment to be incorporated in the Work) without OWNER's prior written approval.

C. The following firms have been under contract to the OWNER in the design phase of the Work. They shall not be used as subcontractors by the CONTRACTOR.

[list firms if applicable]

2.6 SUBMISSION OF BIDS

A. Bids shall be submitted at the time and place indicated in the Invitation to Bid and should be enclosed in a sealed envelope, marked with the Construction Contract name and number, the name and address of the Bidder, and the date and the opening

time for Bids. If the Bid is sent through the mail or other delivery system the sealed envelope should be enclosed in a separate envelope with the notation "BID ENCLOSED" on the face of it. It is the sole responsibility of the Bidder to deliver the Bid before the scheduled time. Bids received after due date and time will not be accepted.

B. Bidder will make no recapitulations, stipulations, alterations, alternate submissions, or modifications in any manner to any of the Contract Documents.

C. Bidder must submit a Bid by completing all of the Bid Form documents, which are:

1. The Bid portion of the Bid Form which is included in these Contract Documents, which shall be in the form of a lump sum, or in the form of unit pricing pursuant to the Bid Schedule, as called for in the Bid Form.

2. The Bid Security.

D. Alternate bids, other than those called for in the Bid Form, will not be considered.

E. No oral, telegraphic, telephonic, facsimile or modified bids will be considered.

2.7 MODIFICATION AND WITHDRAWAL OF BIDS

A. At any time prior to the opening of Bids, Bids may be modified or withdrawn if a written notice of modification or withdrawal is signed by Bidder and delivered to the place where Bids are to be submitted. Bid Security will be returned upon proper withdrawal of a Bid prior to the time for Bid opening.

B. Within 24 hours after Bids are opened, any Bidder may file written notice with OWNER that there was a substantial mistake made in the preparation of its Bid. Bidder must thereafter promptly demonstrate Bidder's mistake. The OWNER has sole discretion to determine whether to permit any modification or withdrawal or the return of any Bid Security.

C. When it appears a mistake has been made, or when the OWNER desires an assurance of any matter, the OWNER may request a Bidder to confirm the Bid in writing.

2.8 OPENING OF BIDS

A. Bids will be opened and read aloud publicly unless obviously nonresponsive. An abstract of the amounts of the base schedule of prices and any alternate schedules will be made available for review after the opening of Bids.

B. Any Bids received after the time specified in the Invitation to Bid will be returned unopened.

2.9 BIDS SUBJECT TO ACCEPTANCE FOR 30 DAYS

A. All bids remain subject to acceptance for 30 days after the day of the Bid opening. OWNER may, in its sole discretion, release any Bid and return the Bid security prior to that date.

PART 3 EVALUATION AND AWARD

3.1 SUBMITTALS REQUIRED FOR EVALUATION

A. After Bid opening, the Bidder, whose Bid is under consideration, must submit the following at the times specified:

1. **Bidder Status Report**: Document 00 45 43. The Bidder shall submit this form within 24 hours of Notice of Award.

2. **Subcontractor and Supplier Report**: Document 00 45 13. The Bidder shall submit this report form within 24 hours of Notice of Award, or sooner if requested by ENGINEER.

3.2 EVALUATION OF BIDDER'S QUALIFICATIONS

A. Within seven (7) calendar days of OWNER’s or ENGINEER's request, a Bidder, whose Bid is under consideration for award shall submit to the OWNER or ENGINEER the following information for the Bidder. OWNER or ENGINEER may request like information on Bidder's Subcontractors, Bidder's Suppliers or any other information the OWNER or ENGINEER may require.

1. A current financial statement for the Work (as provided to bonding company);

2. A chronological list of "in progress" and "completed" construction work done by Bidder during the last 3 years; including project name, address, owner, contract name, and current telephone number;

3. Present construction commitments other than items listed in paragraph 2 above;

4. Proposed organizational structure such as firm ownership, project manager, progress scheduler, and superintendent for the Work of this Project;

5. Owned and rented equipment which is to be used to do the Work;

6. Investigations, arbitration, litigation or claims which are pending, threatened, settled or otherwise disposed of within the last three (3) years;

7. Evidence of ability to perform and complete the Work in a manner and within the time limit specified. As a minimum, identify specific experience on projects similar to the Work in physical size, cost, and commercial nature. If the work experiences of the project manager and superintendent designated to construct this project are different than that of the company, provide resumes of their work history. Include their actual project titles and indicate their actual responsibilities on each given project;

8. All matters consistent with federal, state and local Laws and Regulations; and

9. Such other data as may be called by the OWNER or ENGINEER.

B. If Bidder believes any information should be held confidential for business reasons, Bidder must submit a written claim of business confidentiality for that particular information and include a specific statement of the reasons supporting the claim pursuant to Utah Code Ann. § 63-2-101, *et seq.*

C. Untimely response or failure to provide the requested information by Bidder will release OWNER of any obligation to further consider the Bidder's Bid.

3.3 EVALUATION OF BIDS

A. OWNER reserves the right to reject any and all Bids or any part thereof; to award, any, all, or any number of Bid Schedule(s); to waive any informalities in the Bid Schedule(s) and elsewhere; to negotiate and agree to contract terms with the successful Bidder; to disregard nonconforming, nonresponsive, unbalanced or conditional Bids; and to withhold the award for any reason deemed in the best interests of the OWNER, as solely determined by OWNER.

B. OWNER reserves the right to reject any Bid if OWNER believes that it would not be in the best interest of the Project or the OWNER. Without limitation, such rejection may be because the Bid is not responsive, or the Bidder is unqualified or of doubtful ability or the Bid or Bidder fails to meet any other pertinent standard or criteria established by OWNER, as solely determined by OWNER.

C. If the OWNER intends to make an award to a Bidder, a Notice of Award will be issued.

D. OWNER may consider all information which OWNER believes is relevant when evaluating a Bid, including, without limitation:

1. The qualifications and experience of the Bidder and of the Subcontractors, Suppliers, and other persons and organizations proposed (whether or not the Bid otherwise complies with the prescribed requirements).

2. Such alternates, unit prices and other data, as may be requested in the Bid Form, Bid Schedule, or written requests issued prior to OWNER's Notice of Award the Construction Contract.

3. Operating costs, maintenance requirements, performance data, and guarantees of ability to provide the required materials and equipment.

4. Corporate organization and capacity for any party.

5. Ability to perform and complete the Work in the manner and within the time specified.

6. Pending litigation.

7. The amount of the Bid.

8. Proper licensing to do the Work in compliance with licensing laws of the State of Utah for contractors and subcontractors.

9. All other relevant matters, consistent with OWNER's procurement code and administrative rules, OWNER's ordinances and program policies.

F. To establish qualifications of Bidder, OWNER may request such data indicated in the Bid Documents, conduct such investigations as OWNER deems appropriate, and consider any other information (whether obtained from the Bid, the Bidder, or any other source).

G. If the Construction Contract is to be awarded, it will be awarded to the most responsive, qualified, and responsible Bidder as determined by the OWNER. Alternates may be accepted depending upon availability of OWNER's funds and as determined by the OWNER. Accepted alternates will be considered in determining the most responsive, qualified, and responsible Bidder.

H. Bid Schedules will be evaluated as follows:

1. Discrepancies in the multiplication of quantities of Work items and unit prices will be resolved in favor of the unit prices. OWNER may correct Bid Schedule calculation errors accordingly.

2. Prices written out in words shall govern over prices written out in numbers.

3. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

4. Bids shall not contain any recapitulations of or changes in the work to be done.

I. The OWNER, in the OWNER's sole discretion, shall make determinations as to disqualification of Bidders or rejection of Bids. Such matters may include, without limitation, submission of more than one Bid by the Bidder (whether under the same or different names); evidence of collusion among Bidders; other commitments of Bidder which, in the OWNER's sole judgment, might hinder the Work; previous defaults, Bid irregularities when not waived in the best interests of the OWNER, delays or poor performance by Bidder on any project; official action against Bidder; and any other cause which, in the OWNER's sole discretion and judgment, is sufficient to justify disqualification of a Bidder or rejection of a Bid.

3.4 ADJUSTMENTS TO THE COST OF THE WORK AFTER OPENING OF BIDS

A. The Contract Price identified in the Agreement represents the cost of the work which is to be paid by the OWNER to the CONTRACTOR.

B. Adjustments to the Contract Price which are agreed to between the OWNER and the successful Bidder shall be effected by signing an Agreement Supplement.

3.5 SUBSTITUTIONS

A. The Construction Contract, if awarded, will be on the basis of materials and equipment described in the Drawings, Specifications and any Addenda.

B. After the Effective Date of the Construction Contract, the procedure for submitting an application for substitution is set forth in Article 6.4 of the General Conditions.

3.6 SUBMITTALS REQUIRED FOR AWARD OF CONTRACT

A. The OWNER's requirements as to performance and payment Bonds are as set forth in the Modifications to General Conditions (Document 00 73 00). Specific requirements are set forth in the Performance Bond (Document 00 61 13.13) and the Payment Bond (Document 00 61 13.16).

1. The form of the Bonds should be carefully examined by the Bidder.

2. When the successful Bidder delivers the executed Construction Contract to OWNER, it must be accompanied by the required Performance and Payment Bonds.

B. When a determination has been made to award the Construction Contract, Bidder is required, prior to the award or after the award, or both, to furnish such other information as the ENGINEER requests.

3.7 SIGNING OF AGREEMENT

A. Within 10 working days after OWNER gives Notice of Award the Construction Contract to the successful Bidder, the Bidder shall pick up, sign and return to OWNER, the required number of copies of the Construction Contract, bonds and insurance. A minimum of two (2) originals will be signed and returned to the OWNER. One executed original will be returned to the Bidder. Bidder shall comply with all execution requirements.

B. All of Bidder's executions and submittals must be delivered to the OWNER before OWNER will execute the Construction Contract. The Construction Contract will not be deemed awarded and shall not be binding on the OWNER until it has been approved and executed by the OWNER, and a fully executed copy is formally delivered to the CONTRACTOR. The OWNER reserves the right to rescind its Notice of Award without liability, except for the return of Bidder's Bid Security, at any time before the Construction Contract has been fully executed by all parties and delivered to the CONTRACTOR.

C. Transfers, delegations or assignments of interests in the Contract Documents are prohibited, unless prior written authorization is received from the OWNER.

E. At the time of Bidding, and the signing of the Agreement, and at all times during the Work, Bidder shall be properly licensed to do the Work and shall be in compliance with the license laws of the State of Utah, and Herriman City. The Bidder shall also require all Subcontractors to do the same.

F. If a Bidder fails to fully and properly execute the Construction Contract and provide all submittals required therewith within ten (10) days after the date of the Notice of Award, the OWNER may elect to rescind the Notice of Award, and the OWNER shall be entitled to the full amount of Bidder's Bid Security, not as a penalty, but in liquidation of and compensation for damages sustained. In the OWNER's sole discretion, a Notice of Award may then be provided to another bidder whose Bid is most advantageous to the OWNER, price and other factors considered.

END OF DOCUMENT

DOCUMENT 00 41 43
BID FORM

PART 1 GENERAL

1.1 BIDDER

A. The Bidder is as follows

Name: _____

Address: _____

_____

Telephone number: _____ Fax number: _____

Tax identification number: _____

B. Bidder holds license number _____, issued on the _____ day of _____, _____, by the Utah State Department of Commerce, Division of Occupational and Professional Licensing. Bidder is licensed to practice as a _____ Contractor. License renewal date is the _____ day of _____, _____.

C. The undersigned hereby acknowledges receipt of the following Addenda.

_____

_____

(list Addenda numbers here)

1.2 BID PROPOSAL

A. After having personally and carefully examined all conditions surrounding the Work and the Contract Documents, the undersigned proposes to furnish all labor, equipment, tools and machinery and to furnish and deliver all materials not specifically mentioned as being furnished by the OWNER, which is required in and about the construction of the Construction Contract known as

HERRIMAN CITY
2019 New Restroom Facilities

B. The undersigned proposes to complete the Work for the price or prices listed in the Bid Schedule and understands that quantities for Unit Price Work are not guaranteed.

C. The undersigned proposes to furnish bonds with the Contract, signed by a surety company satisfactory to the OWNER, in an amount equal to the Contract amount conditioned to insure compliance with all requirements of the Contract Documents.

E. The undersigned proposes to execute the attached contract within ten (10) days after the Notice of Award, and to begin work within ten (10) days after being notified to do so by the OWNER.

F. If OWNER finds it necessary to further define the Work, Contract Price, Contract Time or some other portion of the Construction Contract, after Bid opening, the Bidder promises to execute an Agreement Supplement prior to or concurrent with the execution of the Agreement, if the Agreement Supplement is acceptable to the Bidder.

G. It is understood that the OWNER has the right to reject this proposal or to accept it, or any portion therein, at the prices listed in the Bid Schedule.

H. The undersigned understands that the low BIDDER will be selected based on the summation of all bid schedules, including BASE BID SCHEDUL A, BASE BID SCHEDULE B, and the ADDITIVE BID ALTERNATE 1.

1.3 REFERENCES

A. APWA 01 29 00: Payment Procedures.

B. Document 00 52 43: Agreement.

1.4 SCHEDULE TO BE ADDED TO THE AGREEMENT

A. This document will be added to the Agreement by reference.

PART 2 BID SCHEDULE

2.1 BASE BID

A. Location: The Base Bid covers work on the following projects:

Base Bid Schedule A – Arches Park Restroom

Item No.	Item	Estimated Quantity	Unit	Total Price
A1	Arches Park Restroom Facility	1	LS	$
TOTAL BID SCHEDULE A		**=**		**$**

TOTAL BID PRICE FOR BASE BID SCHEDULE A

_____

_____ DOLLARS ($ _____)

(use words)

Base Bid Schedule B – Prairie Oaks Park Restroom

Item No.	Item	Estimated Quantity	Unit	Total Price
B1	Prairie Oaks Restroom Facility	1	LS	$
TOTAL BID SCHEDULE B		**=**		**$**

TOTAL BID PRICE FOR BASE BID SCHEDULE B

_____

_____ DOLLARS ($ _____)

(use words)

2.2 ADDITIVE BID ALTERNATE 1

Additive Bid Alternate 1– Cemetery Restroom

Item No.	Item	Estimated Quantity	Unit	Total Price
1	Cemetery Restroom Facility	1	LS	$
TOTAL ADDITIVE BID ALTERNATE 1		**=**		**$**

TOTAL BID PRICE FOR ADDITIVE BID ALTERNATE

_____

_____ DOLLARS ($ _____)

(use words)

2.3 **BID TOTAL**

Base Bid Schedule "A" Total	$_____
Base Bid Schedule "B" Total	$_____
Additive Bid Alternate 1 Total	$_____
Grand Total – All Schedules & Alternates	**$_____**

Respectfully Submitted,

_____
Bidder

Date: _____

(Corporate Seal)
If bid is by corporation

By: _____
Name and Title

_____
Witness

Herriman City
2019 New Restrooms Facilities

CONTRACTING REQUIREMENTS

AGREEMENT FORMS

BONDS AND CERTIFICATES

SUPPLEMENTARY CONDITIONS

SUPPLEMENTAL SPECIFICATIONS

PROJECT SPECIAL PROVISIONS

DOCUMENT 00 43 36
SUBCONTRACTOR AND SUPPLIER REPORT

PART 1 GENERAL

1.1 BIDDER

A. Name: _____

Address: _____

_____

B. Telephone Number: _____

1.2 CONSTRUCTION CONTRACT

A. The Construction Contract is known as:

HERRIMAN CITY
2019 New Restroom Facilities

PART 2 REPORT

2.1 SUBCONTRACTOR AND SUPPLIER REPORT

A. Failure of the Bidder to specify a Subcontractor for any portion of the Work constitutes an agreement by the Bidder that the Bidder is fully qualified to perform that portion, and that Bidder shall perform that portion.

B. Bidder will be fully responsible to OWNER for the acts and omissions of Subcontractors and Suppliers and of persons either directly or indirectly employed by them, as Bidder is for the acts and omissions of persons employed by Bidder directly.

C. Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor or Supplier and the OWNER. Bidder agrees each subcontract with Bidder's Subcontractor will disclaim any third party or direct relationship between OWNER and any Subcontractor or Supplier.

D. The names and addresses of the Subcontractors and Suppliers who will work under the terms of the Contract Documents and the estimated dollar amount of each

subcontract (in excess of 2 percent of the Bid sum) are set forth as follows:

Table 1 - BASE BID

SUBCONTRACTORS		
Name and Address	**Nature and Extent of Work to be Sublet**	**Amount**
1.		
2.		
3.		
SUPPLIERS		
Name and Address	**Nature and Extent of Work to be Sublet**	**Amount**
1.		
2.		
3.		
4.		

PART 3 EXECUTION

3.1 EFFECTIVE DATE

A. Bidder executes this Subcontractor and Supplier report and declares it to be a supplement to the Bid and in effect as of _____, 20__.

3.2 BIDDER'S SUBSCRIPTION

A. Bidder's signature: _____

B. Please print Bidder's name here: _____

C. Title: _____

END OF DOCUMENT

DOCUMENT 00 45 43
BIDDER STATUS REPORT

PART 1 GENERAL

1.1 **BIDDER**

A. Name: _____

B. Address: _____

_____

C. Telephone number: _____

1.2 **CONSTRUCTION CONTRACT**

A. The Construction Contract is known as:

HERRIMAN CITY
Prairie Oaks Pavilion

PART 2 REPORT

2.1 **BIDDER STATUS REPORT**

A. Bidder affirms the following information is true and correct.

1. Number of employees: _____

2. Bidder's firm is: (check the following as applicable)
[___] Independently owned and operated.
[___] An affiliate of*
[___] A subsidiary of*
[___] A division of*
[___] A business with gross revenue in excess of $_____
[___] A business with gross revenue below $_____

* PARENT COMPANY:
Name: _____

Address: _____

_____

Telephone number: _____

Fax Number: _____

PART 3 EXECUTION

3.1 EFFECTIVE DATE

A. Bidder executes this status report and declares it to be a supplement to the Bid and in effect as of _____, _____.

3.2 BIDDER'S SUBSCRIPTION

A. Bidder's Signature: _____

B. Please print Bidder's name here: _____

C. Title: _____

END OF DOCUMENT

DOCUMENT 00 51 00
NOTICE OF AWARD

Date: PROJECT NO.: _____

TO: _____
(Bidder)

ADDRESS: _____

_____

CONTRACT FOR ***Herriman City Prairie Oaks Pavilion***

The OWNER has considered the BID dated _____, 20_____, submitted by you for the above described WORK in response to its Invitation for Bids and Information for Bidders.

You are hereby notified that you BID has been accepted for items in the amount of: _____
_____and No/100----------Dollars ($).

You must comply with the following conditions precedent within fifteen (15) days of the date of this Notice of Award, that is by _____, 20____.

1. You must deliver to the Owner any remaining information requested by Engineer or otherwise identified in the Information for Bidders.
2. You must deliver Performance Bond, Payment Bond, and Certificates of Insurance as specified in the Instructions to Bidders, General Conditions.

If you fail to execute said Agreement and to furnish said Bonds within fifteen (15) days from the date of the Notice, OWNER will be entitled to consider all your rights arising out of the OWNER's acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such other rights as may be granted by law.

You are required to return acknowledged copies of the NOTICE OF AWARD to the OWNER. A copy will be returned to the CONTRACTOR of all the executed Contract Documents when all the signatures have been obtained.

OWNER: Herriman City

By: _____

Title: City Manager

ACCEPTANCE OF NOTICE

Receipt of the above Notice of Award is hereby acknowledged by _____
_____ this _____ day of _____, 20_____.

By: _____

Title:_____

DOCUMENT 00 52 43
AGREEMENT

PART I GENERAL

1.1 CONTRACTOR

A. Name: _____

B. Address: _____

C. Telephone number: _____

D. Facsimile number: _____

E. E-Mail addresses: _____

1.2 OWNER

A. Herriman City, a municipal corporation of the State of Utah, 5355 West Herriman Main Street, Herriman, Utah 84096.

1.3 CONSTRUCTION CONTRACT

The Construction Contract is known as

HERRIMAN CITY
Prairie Oaks Pavilion

1.4 ENGINEER

A. ***Blake Thomas, PE, or his designee*** is the Engineer who has the rights, authority and duties assigned to Engineer in the Contract Documents; provided, however, Engineer shall not have authority to increase the contract price to an amount that exceeds the amount budgeted for the project by the Owner for the Project.

1.5 AGREEMENT PERFORMANCE

A. The Contractor shall perform everything required to be performed by Contractor in the Contract Documents, shall provide and furnish all labor, tools and equipment, and shall furnish and deliver all materials not specifically stated in the Contract Documents as being furnished by the Owner, to complete all the work necessary to complete the Project in Herriman City, State of Utah in the best and most workmanlike manner, and in strict conformity with the provisions of this Agreement. The plans and specifications and the proposals are hereby made a part of the agreement as fully and to the same effect as if the same had been set

forth at length in the body of this Agreement. In the event of inconsistencies within or among parts of this Agreement, the Contract Documents or among Contract Documents, this Agreement, and applicable standards, codes, and references to previous versions of the Manual of Standard Specifications or Manual of Standard Plans, the Contractor shall (i) provide the better quality or greater quantity of work; or (ii) comply with the more stringent requirement; either or both in accordance with Engineer's interpretation.

B. It is agreed that the status of the Contractor under this agreement is that of Independent Contractor rather than that of an Employee of the Owner. Accordingly, the Contractor, in performance of his obligations hereunder, is independent and free from control of the Owner in all that pertains to the execution of the work and shall perform the work according to the Contractor's own methods without being subject to the rule, control or direction of the Owner or its representatives, save and except as to the results obtained. The finished work and the materials furnished must, however, conform strictly to this contract, the proposal, and the plans and specifications, and are subject to the final approval of the Owner and its authorized representatives, who may exert such direction and control thereof as may be necessary to achieve that conformity. All provisions in the specifications with respect to the direction and control of the work shall be construed so as to make effective this provision. It is agreed that the status of the Contractor under this agreement is that of Independent Contractor rather than that of an Employee of the Owner. Accordingly, the Contractor, in performance of his obligations hereunder, is independent and free from control of the Owner in all that pertains to the execution of the work and shall perform the work according to the Contractor's own methods without being subject to the rule, control or direction of the Owner or its representatives, save and except as to the results obtained. The finished work and the materials furnished must, however, conform strictly to this contract, the proposal, and the plans and specifications, and are subject to the final approval of the Owner and its authorized representatives, who may exert such direction and control thereof as may be necessary to achieve that conformity. All provisions in the specifications with respect to the direction and control of the work shall be construed so as to make effective this provision. It is agreed that the status of the Contractor under this agreement is that of Independent Contractor rather than that of an Employee of the Owner. Accordingly, the Contractor, in performance of his obligations hereunder, is independent and free from control of the Owner in all that pertains to the execution of the work and shall perform the work according to the Contractor's own methods without being subject to the rule, control or direction of the Owner or its representatives, save and except as to the results obtained. The finished work and the materials furnished must, however, conform strictly to this contract, the proposal, and the plans and specifications, and are subject to the final approval of the Owner and its authorized representatives, who may exert such direction and control thereof as may be necessary to achieve that conformity. All provisions in the specifications with respect to the direction and control of the work shall be

construed so as to make effective this provision. It is agreed that the status of the Contractor under this agreement is that of Independent Contractor rather than that of an Employee of the Owner. Accordingly, the Contractor, in performance of his obligations hereunder, is independent and free from control of the Owner in all that pertains to the execution of the work and shall perform the work according to the Contractor's own methods without being subject to the rule, control or direction of the Owner or its representatives, save and except as to the results obtained. The finished work and the materials furnished must, however, conform strictly to this contract, the proposal, and the plans and specifications, and are subject to the final approval of the Owner and its authorized representatives, who may exert such direction and control thereof as may be necessary to achieve that conformity. All provisions in the specifications with respect to the direction and control of the work shall be construed so as to make effective this provision.

PART 2 TIME AND MONEY CONSIDERATIONS

2.1 CONTRACT PRICE

A. The Contract Price includes the cost of the Work specified in the Contract Documents, and the cost of all bonds, insurance, permits, fees, and all charges, expenses or assessments of whatever kind or character. The Owner shall pay the Contractor, as full consideration for the performance of this contract, the contract bid price per item as shown in the proposal, for the quantities of work actually performed and accepted.

B. The Contract Price is: _____ Dollars ($).

2.2 CONTRACT TIME

A. The work shall commence on the date set forth in the written Notice to Proceed from the Owner or its agent to Contractor and shall be completed and ready for Owner's substantial completion inspection within ***120*** calendar days from the date of such notice.

B. Any time specified in work sequences in the Summary of Work (Section 01 11 10) shall be a part of the Contract Time.

2.3 PUNCH LIST TIME

A. The Work will be complete and ready for final payment within 30 calendar days after the date Contractor receives Engineer's Final Inspection Punch List unless exemptions of specific items are granted by Engineer in writing or an exception has been specified in the Contract Documents.

B. Permitting the Contractor to continue and finish the Work or any part of the Work after the time fixed for its completion, or after the date to which the time for completion may have been extended, whether or not a new completion date is established, shall in no way operate as a waiver on the part of the Owner of any of Owner's rights under this Agreement.

2.4 LIQUIDATED DAMAGES

A. **Late Completion**: Time is the essence of the Contract Documents. Contractor agrees that Owner will suffer damage or financial loss if the Work is not completed on time or within any time extensions allowed in accordance with Part 12 of the General Conditions (Document 00 72 00). Contractor and Owner agree that proof of the exact amount of any such damage or loss is difficult to determine. Accordingly, instead of requiring any such proof of damage or specific financial loss for late completion, Contractor agrees to pay to Owner the amount of ***$1,000*** for each calendar day that extends after the Contract Time until the Work is accepted as Substantially Complete as provided in Article 14.5 of the General Conditions.

B. **Survey Monuments**: No land survey monument will be disturbed or moved until Engineer has been properly notified and the Engineer's surveyor has referenced the survey monument for resetting. The parties agree that upon such an unauthorized disturbance it is difficult to determine the damages from such a disturbance, and the parties agree that Contractor will pay as liquidated damages the sum of $1,000 to cover such damage and expense.

C. **Interruption of Public Services**: No interruption of public services shall be caused by Contractor, its agents or employees, without the Engineer's and Owner’s prior written approval. Owner and Contractor agree that in the event Owner suffers damages from such interruption, liquidated damages as stipulated above shall not be deemed to be a limitation upon Owner's right to recover the full amount of damages.

D. **Deduct Damages from Moneys Owed Contractor**: Owner shall be entitled to deduct and retain liquidated damages out of any money which may be due or become due the Contractor. To the extent that the liquidated damages exceed any amounts that would otherwise be due the Contractor, the Contractor shall be liable for such amounts and shall return such excess to the Owner.

2.5 RETAINAGE

A. **Retainage is Owner's Option**: Owner may, in its sole discretion, retain five (5) percent of the value of all Work done and materials or equipment supplied as part security for the fulfillment of the Construction Contract by the Contractor. If, in Engineer's opinion, the Work is proceeding in accordance with Contractor's approved progress schedule, and all progress schedule submittals are current and up to date, and all required payrolls, Shop Drawings, and miscellaneous submittals are current and up to date, the Owner may choose not to withhold retainage.

1. **Reducing the Retainage**: As the Work nears completion and solely at the Engineer's discretion, the Owner may reduce the retainage to an amount more in line with the Work actually remaining.

2. **Retainage Held Until Final Payment**: The Owner reserves the right to retain all amounts previously withheld or due the Contractor, including liquidated damages, until all Punch List items are complete. However, at Engineer's sole option, Engineer may authorize the release of up to all retained amounts except any liquidated damages and double Engineer's best estimate of the Contractor's cost to complete all remaining Punch List items.

B. **Interest**: Except for money retained for items not provided or installed in accordance with the Contract Documents, any money retained by the Owner will be placed in an interest-bearing account held by the Owner in its Utah State Treasury Pool. The interest accrued thereon shall be the only interest paid to Contractor on the money retained and will be due and payable to the Contractor when the retained monies are paid.

2.6 PAYMENT PROCEDURES

A. **Progress Payments**: Contractor shall submit Applications for Payment in accordance with Part 14 of the General Conditions (Document 00 72 00) and Section 01 29 00 (Payment Procedure). Payment will become due or payable only for items provided or installed by Contractor. If required by the Owner, any request or application by the Contractor for a partial payment shall be accompanied and supported by data establishing payment or satisfaction of all Contractor obligations for payroll, bills for materials and equipment, and other indebtedness, with such data establishment to be evidenced by receipts, releases and waivers of lien, arising out of the contract, to the extent and in such form as may be designated as acceptable and satisfactory by the Owner. The Owner may require such data, including but not limited to, and executed, completed lien waiver and release from all subcontractors, lower-tier subcontractors and suppliers. The submission of these items, if requested by the Owner with the Contractor’s application or request for a partial payment shall constitute a condition precedent to the Contractor’s right to any such partial payment, and any

particular application or request for partial payment submitted without these items, if so requested by the Owner, shall be deemed incomplete.

1. **Withholding Payment**: Owner reserves the right to withhold payment from Contractor for noncompliance with any provision of the Contract Documents.

2. **Price Adjustments**: Owner will consider making partial payment to the Contractor for certain nonconforming work in advance of any negotiated settlement reached between the Contractor and the Owner, provided the Contractor requests in writing that this be done. Contractor agrees that any such payments made by the Owner are "payments in advance" and that any money which becomes due when the final settlement is negotiated will not constitute payments "withheld" or "retained" under State law.

B. **Final Payment**: After completion of all Work and Punch List items, Owner shall pay the Contract Price due after deducting therefrom all previous payments, unit price quantity adjustments, penalties, liquidated damages, and other amounts to be retained. All prior progress payments shall be subject to correction in the final payment. The final payment shall not be due and payable until the expiration of 30 days from approval of the request for final payment of Contractor by Engineer and Owner. Final payment, constituting the entire unpaid balance of the contract sum, shall be paid by the Owner to the Contractor when the work has been completed, the contract fully performed, and a final certificate for payment has been issued by the Engineer. Neither the final payment nor the remaining retainage shall become due until the Contractor submits to the Owner through the Engineer, (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the work for which the Owner might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety to final payment, and (3) if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the contract, to the extent and in such form as may be designated by the Owner. If after substantial completion of the work, final completion thereof is materially delayed through no fault of the Contractor or by the issuance of change orders affecting final completion, and the Engineer so confirms, the Owner shall, upon application by the Contractor and certification by the Engineer and without terminating the contract, make payment of the balance due for that portion of the work fully completed and accepted. If the remaining balance for work not fully completed or corrected is less than the retainage stipulated in the contract documents, and if bonds have been furnished, the written consent of the Surety of the payment of the balance due for that portion of the work fully completed and accepted shall be submitted by the Contractor to the Engineer prior to certification of such payment. Such payment shall be made under the terms and conditions governing payments as heretofore set forth, except that it shall not constitute a waiver of claims. The making of final payment shall constitute a waiver of all claims by the Owner except those arising from: (1)

unsettled liens; (2) faulty or defective work; (3) failure of the work to comply with the requirements of the contract documents; or (4) terms of any special warranties required by the contract documents. The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final application for payment. All provisions of this agreement, including without limitation those establishing obligations and procedures, shall remain in full force and effect notwithstanding the making or acceptance of final payment.

1. **Submittal**: Final payment shall not be made until the Contractor has delivered and Engineer has accepted all submittals specified in Article 14.8 of the General Conditions (Document 00 72 00).

2. **Owner Released From Claims**: The payment and acceptance of the final Contract Price due and the adjustment and payment for any Work done in accordance with any alterations of the same, shall release the Owner from any and all claims of Contractor on account of Work performed under the Contract Documents or any Modification thereof, except for those claims specifically agreed to as reserved and unresolved by the Owner.

2.7 EXTRA WORK

A. No money will be paid to the Contractor for any additions, deletions or revisions in the Work as stipulated in Article 10.1 of the General Conditions (Document 00 72 00), unless a contract Modification for such has been made in writing and validly executed by the Owner and Contractor.

PART 3 COVENANTS

3.1 ASSIGNMENT NOT BINDING WITHOUT WRITTEN CONSENT

A. Owner and Contractor agree no assignment of any right or interest in the Contract Documents will be made without the written consent of the Owner and the Contractor. No assignment will release or discharge the Owner or the Contractor from any duty or responsibility under the Contract Documents unless specifically stated to the contrary in any written consent to an assignment.

B. Contractor shall make no assignment of money that is due without the Owner's written consent (except to the extent that the effect of this restriction may be limited by Law or Regulation).

3.2 BINDING TERMS

A. The Agreement, with all its forms, plans, specifications and stipulations, shall be binding upon the heirs, executors, administrators, successors and assigns of the respective parties.

3.3 INDEMNIFICATION

A. Provisions concerning indemnification are set forth in Article 6.17 of the General Conditions (Document 00 72 00) as modified by Supplemental Conditions (Document 00 73 00).

3.4 DISPUTE RESOLUTION

A. **In General**:

1. Unless a decision shall be held by an appropriate court of law to have been procured by fraud or to be arbitrary and capricious or so grossly erroneous as necessarily to imply bad faith, any factual decision made under this Article shall be final and binding in any suit or action arising under this Construction Contract, including any actions by Contractor or others against Owner or any of Owner's agents, consultants, or employees.

2. Compliance with provisions of this Article shall be a condition precedent prior to any legal action by the Contractor or any of Contractor's Subcontractors and Suppliers against Owner or any of Owner's agents, consultants, or employees.

3. The provisions of this Article shall not preclude or limit judicial review of issues of law.

B. **Disputes Not Related to the Guarantee of the Work**: Any dispute arising under the Construction Contract concerning a question of fact, not related to the guarantee of the Work (Part 13 of the General Conditions (Document 00 72 00)), which is not disposed of by contract Modification shall be decided pursuant to the following procedure.

1. Any decision by Engineer interpreting the requirements of the Contract Documents may be appealed in writing to the Engineer. The Engineer's decision shall be reduced to writing and a copy shall be mailed or otherwise furnished to the Contractor. The decision of Engineer shall be final and conclusive unless, within 30 days from the date of receipt of such copy, the Contractor mails or otherwise furnishes to Engineer a written appeal to the Owner.

2. Within 15 days from the receipt of any such appeal, the City Administrator shall issue a decision in writing and mail or otherwise furnish a copy thereof to the Contractor. The decision of the City

Administrator shall be final and conclusive unless, within 15 days from the date of receipt of such decision, the Contractor mails or otherwise furnishes to the City a written appeal to a Dispute Committee.

3. The Dispute Committee shall consist of the Owner's Attorney, the Mayor, and an independent engineer selected by the Owner.

4. Said Committee shall have authority to investigate the appeal.

5. The decision of said Committee shall be rendered in writing within 15 days from receipt of the appeal and mailed or otherwise delivered to the Contractor.

6. The decision of said Committee shall be the final binding interpretation of the facts which are the subject of the appeal.

C. **Disputes Related to the Guarantee**: Except as otherwise provided by contract Modification, any dispute concerning a question of fact involving or arising out of the guarantee required by the Contract Documents (Article 13.1 of the General Conditions (Document 00 72 00)), which is not disposed of by contract Modification shall be decided pursuant to the provisions of Paragraph 3.4B above.

D. **Work During Appeal**: Notwithstanding the pendency of any protest or appeal provided above, Contractor shall, if so ordered by Engineer, proceed with the Work under the Contract Documents according to Engineer's direction and according to the decision on any appeal. The existence of a claim or protest shall not excuse Contractor from the requirements of the Contract Documents, including, but not limited to, the Contract Time.

E. **Appeals of Termination or Suspension**: Any decision of Owner to terminate or suspend the Work shall not be subject to the provisions of this Article.

3.5 ATTORNEY'S FEES.

A. In the event that either party institutes any action or proceeding against the other relating to the breach of any term of this agreement, then the unsuccessful party in such action or proceeding agrees to reimburse the successful party for the reasonable expenses of such action including reasonable attorney fees, incurred therein by the successful party.

3.6 CONTRACTOR'S REPRESENTATIONS.

The Contractor represents and warrants the following to the Owner (in addition to any other representations and warranties contained in the Contract Documents), as an inducement to the Owner to execute this Agreement, which representations and warranties shall survive the execution and delivery of this Agreement, any termination of

this Agreement, and the final completion of the Work:

A. that it and its Subcontractors are financially solvent, able to pay all debts as they mature, and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;

B. that it is able to furnish the plant, tools, materials, supplies, equipment, and labor required to complete the Work and perform its obligations hereunder;

C. that it is authorized to do business in the State of Utah and properly licensed by all necessary governmental and public and quasi-public authorities having jurisdiction over it and over the Work and the Project;

D. that its duly authorized representative has visited the site of the Project, familiarized himself with the local and special conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents; and

E. that it possesses a high level of experience and expertise in the business administration, construction, construction management, and superintendence of projects of the size, complexity, and nature of this particular Project, and it will perform the Work with the care, skill and diligence of such a contract.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations, and performance hereunder. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the work called for hereunder.

3.7 SPECIAL PROVISIONS REGARDING NONFUNDING

The Contractor specifically understands and agrees that funds are not presently available for performance of this Agreement beyond the end of Owner's fiscal year, which is June 30, 2018. Each party's obligation for performance of this Agreement beyond such date is contingent upon funds being budgeted and appropriated for payment with respect to this Agreement. If no such funds or insufficient funds are appropriated and budgeted in any fiscal year, or if there is a reduction in appropriation due to insufficient revenues, resulting in insufficient funds for the payments due or about to become due under this Agreement, then this Agreement shall create no obligation on the parties as to such fiscal years (or any succeeding fiscal year), and all obligations thereunder shall terminate and become null and void on the first day of the fiscal year on which funds were not budgeted or appropriated or in the event of reduction in appropriation on the last day before the reduction became effective (except as those portions of payments herein then agreed upon for which funds are appropriated and budgeted.) Such said termination shall not be construed as a breach of or a default under this Agreement and such termination shall be without penalty, additional payment, or other charges of any kind whatsoever to

Contractor and no right of action or damage or other relation shall accrue to the benefit of the Contractor as to this Agreement, or any portion thereof, which may so terminate and become null and void.

3.8 CONTRACT DOCUMENTS.

Contract Documents include the *Manual of Standard Specifications, 2017 Edition*, published by Utah LTAP Center, Utah State University, and *Manual of Standard Plans, 2017 Edition*, published by Utah LTAP Center, Utah State University, and those documents included in the term "Contract Documents" as defined therein.

PART 4 EXECUTION

4.1 EFFECTIVE DATE.

A. Owner and Contractor executed this Agreement and declared it in effect as of the _____ day of _____, 20__.

IN WITNESS WHEREOF, we have hereunto set our hands and seal at Herriman, Utah, on the day and year first above written:

HERRIMAN CITY, OWNER

By_____
Brett geo. Wood, City Manager

Attest:

_____
Jackie Nostrom, City Recorder

Approved as to form:

_____
John N. Brems, City Attorney

_____
[Contractor]

By_____

Its_____

Attest:

_____

By_____

DOCUMENT 00 55 00
NOTICE TO PROCEED

Date:

TO: _____ Project No. _____
(Contractor)

ADDRESS: _____

_____

CONTRACT FOR_____
(Insert name of Contract as it appears in the Bidding Documents)

You are notified that the Contract Time under the above contract will commence to run on ____0 _____, 20___. By that date, you are to start performing your obligations under the Contract Documents. The dates of Substantial Completion and Final Completion are __ _____, 20___ and _____, 20__, respectively.

Before you may start any Work at the Site, you and Owner must each deliver to the other (with copies to Engineer) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also before you may start any Work at the Site, you must

(add other requirements)

Herriman City
(OWNER)

_____
(Authorized Signature)

City Manager
(Title)

ACCEPTANCE OF NOTICE

Receipt of the foregoing Notice to Proceed is hereby acknowledged:

By:_____. this _____ day of _____, 20___.

By:_____

Title:_____

DOCUMENT 00 61 13.13
PERFORMANCE BOND

PART 1 GENERAL

1.1 **BOND**

A. Number: _____

B. Amount: _____

_____ Dollars ($ _____).

1.2 **SURETY**

A. Name: _____

B. Address: _____

_____

C. Telephone number: _____

D. Facsimile number: _____

1.3 **CONTRACTOR**

A. Name: _____

B. Address: _____

_____

C. Telephone number: _____

D. Facsimile number: _____

1.4 **OWNER**

A. ***Herriman City Corporation***

1.5 **CONSTRUCTION CONTRACT**

A. The Construction Contract is known as ***Herriman City 2019 New Restroom Facilities***

1.6 **DEFINED TERMS**

A. Terms used in this Performance Bond which are defined in Article 1.1 of the General Conditions will have the meanings indicated in the General Conditions.

PART 2 COVENANTS

2.1 **SURETY'S AND CONTRACTOR'S RELATIONSHIP**

A. Surety as surety, and CONTRACTOR as principal, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER as obligee, for the performance of the Construction Contract, whether awarded or about to be awarded.

B. If CONTRACTOR performs the Construction Contract, the Surety and the CONTRACTOR shall have no obligation under this Bond, except to participate in conferences indicated in Article 2.3.

2.2 **NOTICE**

A. Notice to the Surety, the OWNER or the CONTRACTOR shall be sent by certified mail, facsimile, or hand delivered to the address shown on this Bond agreement.

B. Notices sent as required by paragraph 2.2A shall be effective on the date on which such notice was sent.

C. Notice may be sent by facsimile. Facsimile notice shall be effective on the date of transmission provided that a confirmation establishing the successful transmission of the notice is sent by first-class mail, postage prepaid, along with a copy of the notice transmitted, no later than twenty-four (24) hours after the facsimile notice is transmitted.

D. If any notice requires a period of less than seven (7) days for response, the notice shall be sent by facsimile.

E. If the time for response to any notice expires on a Saturday, Sunday or a legal holiday in the State of Utah, the time shall be extended to the next working day.

2.3 PROCEDURE TO INVOKE SURETY'S OBLIGATION

A. If the CONTRACTOR fails to perform or to comply with the terms of the Construction Contract, and such failure to perform or to comply has not been waived by the OWNER, the OWNER may notify the CONTRACTOR and the Surety, at their addresses described above, that the OWNER is considering declaring the CONTRACTOR in default.

B. Before declaring the default, the OWNER shall request and attempt to arrange a conference with the CONTRACTOR and the Surety to be held at a time and place required by the OWNER to discuss methods of performing the Work.

C. If the CONTRACTOR does not attend the conference or agree to cure any deficiencies in the CONTRACTOR's performance of the Work to the satisfaction of the OWNER, the OWNER may declare the CONTRACTOR in default and formally terminate the CONTRACTOR's right to complete the Work. Such default shall not be declared earlier than 10 days after the CONTRACTOR and the Surety have received notice as provided in article 2.2.

D. If the Contract with the CONTRACTOR is terminated, the OWNER agrees to pay the unpaid Balance of the Contract Price to the Surety for completion of the Work in accordance with the terms of the Construction Contract or to a contractor selected by the Surety to perform the Work in accordance with the terms of the Construction Contract.

2.4 SURETY'S OPTIONS AT CONTRACTOR TERMINATION

A. Surety Completes the Work: The Surety may undertake to perform and complete the Work itself, through its agents or through independent contractors.

B. Surety Obtains Bids or Proposals: The Surety may obtain bids or negotiated proposals from qualified contractors acceptable to the OWNER for a contract for performance and completion of the Work.

1. Such bids or proposals shall be prepared by the Surety for execution by the OWNER and the completion contractor selected.

2. Surety shall secure the contract with Performance and Payment Bonds executed by a qualified surety equivalent to this Performance Bond and the Payment Bond (Document 00 61 13.16); and

3. Surety shall pay to the OWNER the amount of damages as described in paragraph 2.6 in excess of the balance of the Contract Price incurred by the OWNER resulting from the CONTRACTOR's default.

C. Surety to Pay OWNER: Surety may determine the amount not to exceed the amount of this bond specified in paragraph 1.1B, for which Surety believes it may be liable to pay, and tender payment therefore to the OWNER. OWNER has sole discretion to accept payment. If the OWNER refuses the payment tendered, or the Surety has denied liability in whole or in part, without further notice the OWNER shall be entitled to enforce any remedy available to the OWNER.

2.5 PROCEDURE FOR OWNER TO DECLARE SURETY IN DEFAULT

A. The OWNER may declare the Surety to be in default upon the following procedures.

1. The OWNER shall issue an additional written notice to the Surety, after declaring the CONTRACTOR in default as provided in Article 2.3, demanding that the Surety perform its obligations under this Bond.

2. Surety shall respond to the OWNER within 15 days after receipt of the OWNER's additional notice, either denying the claim or accepting liability and exercising its' options under Article 2.4.

2.6 SURETY'S OBLIGATIONS

A. After the OWNER has terminated the CONTRACTOR's right to complete the Construction Contract, and if the Surety elects to complete the Construction Contract as provided in Article 2.4, then the responsibilities of the Surety to the OWNER shall not be greater than those of the CONTRACTOR under the Construction Contract, and the responsibilities of the OWNER to the Surety shall not be greater than those of the OWNER under the Construction Contract.

B. To the limit of the amount of this Bond, but subject to commitment by the OWNER to pay all valid and proper payments made to or on behalf of the CONTRACTOR under the Construction Contract, the Surety is obligated, without duplication, for:

1. the responsibilities of the CONTRACTOR for correction of Defective Work and completion of the Construction Contract;

2. design professional and delay costs resulting from the CONTRACTOR's default, and resulting from the actions or failure to act of the Surety under article 2.4; and

3. liquidated damages which are or may become due for any reason.

2.7 UNRELATED OBLIGATIONS OF THE CONTRACTOR

A. The Surety and the OWNER shall not be liable to others for obligations of the CONTRACTOR that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or changed on account of any such unrelated obligations.

B. No right of action shall accrue on this Bond to any person or entity other than the OWNER or its heirs, executors, administrators, or successors.

2.8 **SURETY WAIVES NOTICE OF ANY CHANGE**

A. Surety hereby waives notice of any change, including changes of Contract Time, Contract Price and scope of Work, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

2.9 **VENUE**

A. Any suit or action commenced by OWNER under this Bond shall be for action in a court of competent jurisdiction in the State of Utah.

PART 3 EXECUTION

3.1 **EFFECTIVE DATE**

A. Surety and CONTRACTOR execute this Bond agreement and declare it to be in effect as of the _____day of _____, ____.

3.2 **CONTRACTOR'S SUBSCRIPTION AND ACKNOWLEDGMENT**

A. Type of organization: _____
(corporation, partnership, individual, etc.)

B. If CONTRACTOR is a corporation, attach a corporate resolution evidencing CONTRACTOR's authority to sign.

C. CONTRACTOR's signature: _____

D. Please print name here: _____

E. Title: _____

F. Notary Acknowledgement: In the County of _____, State of _____, on the _____ day of _____, 20 ___, the foregoing instrument was acknowledged before me.

Notary's signature

3.3 **SURETY'S SUBSCRIPTION AND ACKNOWLEDGMENT**

A. Attach evidence of Surety's corporate authority to sign.

C. Surety's signature: _____

D. Please print name here: _____

E. Title: _____

F. Notary Acknowledgement: In the County of _____, State of _____, on the _____ day of _____, 20 ___, the foregoing instrument was acknowledged before me.

Notary's signature

END OF DOCUMENT

DOCUMENT 00 61 13.16
PAYMENT BOND

PART 1 GENERAL

1.1 **BOND**

A. Number: _____

B. Amount: _____

_____ Dollars ($_____).

1.2 **SURETY**

A. Name: _____

B. Address: _____

_____

C. Telephone number: _____

D. Facsimile number: _____

1.3 **CONTRACTOR**

A. Name: _____

B. Address: _____

_____

C. Telephone number: _____

D. Facsimile number: _____

1.4 **OWNER**

A. ***Herriman City Corporation***

1.5 **CONSTRUCTION CONTRACT**

A. The Construction Contract is known as ***Herriman City New Restroom Facilities***

1.6 **DEFINED TERMS**

A. Terms used in this Payment Bond which are defined in article 1.1 of the General Conditions will have the meanings indicated in the General Conditions.

PART 2 COVENANTS

2.1 **SURETY'S AND CONTRACTOR'S RELATIONSHIP**

A. Surety as surety, and CONTRACTOR as principal, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the OWNER as obligee, for the performance of the Construction Contract, whether awarded or about to be awarded.

B. If CONTRACTOR performs the Construction Contract, the Surety and the CONTRACTOR shall have no obligation under this Bond.

2.2 **NOTICE**

A. Notice to the Surety, the OWNER or the CONTRACTOR shall be sent by certified mail, facsimile, or hand delivered to the address shown on this Bond agreement.

B. Notices sent as required by paragraph 2.2A shall be effective on the date on which such notice was sent.

C. Notice may be sent by facsimile. Facsimile notice shall be effective on the date of transmission provided that a confirmation establishing the successful transmission of the notice is sent by first-class mail, postage prepaid, along with a copy of the notice transmitted, no later than twenty-four (24) hours after the facsimile notice is transmitted.

D. If any notice requires a period of less than seven (7) days for response, the notice shall be sent by facsimile.

E. If the time for response to any notice expires on a Saturday, Sunday or a legal holiday in the State of Utah, the time shall be extended to the next working day.

2.3 **CONDITIONS OF SURETY'S LIABILITY**

A. With respect to the OWNER, this Bond agreement shall be null and void if the CONTRACTOR promptly takes the following actions:

1. promptly makes payment, directly or indirectly, for all sums due Claimants, and

2. defends, indemnifies and saves harmless the OWNER from all claims, demands, Liens or suits by any person or entity who furnished labor, materials or equipment for use in the performance of the Work, provided the OWNER has tendered defense of such claims, demands, liens or suits to the CONTRACTOR and the Surety.

2.4 PROCEDURE TO INVOKE SURETY'S OBLIGATION

A. **Concerning Claimants who have a Direct Contract with the CONTRACTOR**: The Surety shall have no obligation to Claimants under this Bond who are employed by or have a direct contract with the CONTRACTOR until Claimants have given notice to the Surety at the address shown on this Bond agreement and sent a copy, or notice thereof, to the OWNER, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

B. **Concerning Claimant who does not have a Direct Contract with the CONTRACTOR**: The Surety shall have no obligation to Claimant under this Bond who does not have a direct contract with the CONTRACTOR until Claimant takes the following actions.

1. The Claimant shall furnish written notice to the CONTRACTOR and send a copy, or notice thereof, to the OWNER, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed.

2. The Claimant shall have either received a rejection in whole or in part from the CONTRACTOR, or not received within 15 days of furnishing the above notice any communication from the CONTRACTOR by which the CONTRACTOR has indicated the claim will be paid directly or indirectly.

3. Not having been paid within the above 15 days, the Claimant shall have sent a written notice to the Surety at the address described on this Bond agreement and sent a copy, or notice thereof, to the OWNER stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the CONTRACTOR.

2.5 SURETY'S OPTION TO SETTLE CLAIMS

A. When the Claimant has satisfied the conditions of article 2.4, the Surety shall promptly and at the Surety's expense take the following actions.

1. Send an answer to the Claimant, with a copy to the OWNER, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

2. Pay or arrange for payment of any undisputed amounts.

2.6 SURETY'S OBLIGATION

A. Surety's total obligations under this bond shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

2.7 USE OF FUNDS

A. Amounts owed by OWNER to CONTRACTOR under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, against the Performance Bond (Document 00 61 13.13). By the CONTRACTOR furnishing and the OWNER accepting this Bond, they agree that all funds earned by the CONTRACTOR in the performance of the Work are dedicated as follows:

1. The OWNER has first priority to use the funds for the completion of the Work.

2. The CONTRACTOR and the Surety have second priority to use the funds to satisfy the obligations of the CONTRACTOR and the Surety under this Bond.

2.8 UNRELATED OBLIGATIONS OF THE CONTRACTOR

A. The Surety and the OWNER shall not be liable to Claimants or others for obligations of the CONTRACTOR that are unrelated to the Construction Contract.

B. The OWNER shall not be liable for payment of any damages, costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

2.9 SURETY WAIVES NOTICE OF ANY CHANGE

A. Surety hereby waives notice of any change to the Construction Contract including changes of Contract Time, Contract Price, and scope of Work, or to related subcontracts, purchase orders or other obligations.

2.10 **VENUE**

A. Any suit or action commenced by a Claimant under this Bond shall be for action in a court of competent jurisdiction in the State of Utah.

2.11 **COPIES OF THIS BOND**

A. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the CONTRACTOR or OWNER shall promptly furnish a copy of this Bond or shall permit a copy to be made.

PART 3 EXECUTION

3.1 **EFFECTIVE DATE**

A. Surety and CONTRACTOR executed this Bond agreement and declared it to be in effect as of the _____day of _____, ____.

3.2 **CONTRACTOR'S SUBSCRIPTION AND ACKNOWLEDGMENT**

A. Type of organization: _____
(corporation, partnership, individual, etc.)

B. If CONTRACTOR is a corporation, attach a corporate resolution evidencing CONTRACTOR's authority to sign.

C. CONTRACTOR's signature: _____

D. Please print name here: _____

E. Title: _____

F. Notary Acknowledgement: In the County of _____, State of _____, on the _____ day of _____, 20 ___, the foregoing instrument was acknowledged before me.

_____
Notary's signature

3.3 SURETY'S SUBSCRIPTION AND ACKNOWLEDGMENT

A. Attach evidence of Surety's corporate authority to sign.

B. Surety's signature: _____

C. Please print name here: _____

D. Title: _____

E. Notary Acknowledgement: In the County of _____, State of _____, on the _____ day of _____, 20 ___, the foregoing instrument was acknowledged before me.

_____
Notary's signature

END OF DOCUMENT

SECTION 00 62 76
APPLICATION FOR PAYMENT

Contractor:		To Owner:	Herriman City
Address:		Pay Request No.:	
		Date:	

CONTRACT FOR: ***Herriman City 2019 New Restroom Facilities***

For work accomplished through the dates of through

Contract Change Order Summary

No.	Approval Date	Amount Additions	Amount Deductions
Totals		$ -	$ -
Net Change			$ -

Tabulation of Payment

1. Original Contract Price……	$ -
2. Change Orders……	$ -
3. Revised Contract Price (1+2)……	$ -
4. Total Value of Work Completed to Date*…….	
5. Allowance for Materials Stored on this Date*……	$ -
6. Subtotal (4+5)……	$ -
7. Previously earned by Contractor (Prev. #6)……..	$ -
8. Value of Work Completed this Period (6-7)……..	$ -
9. Retainage Held Prior to this Payment (Prev. #11)…..	$ -
10. Retainage to be Held from this Payment (% of 8)……	$ -
11. Total Retainage to be Held (9+10)……	$ -
12. Payment Due Contractor this Period (8-10)……	$ -

*Detailed breakdown on attached continuation sheet

Contract Time

Original Contract Time (Days)	On Schedule	Starting Date:
Revisions	Yes No	Completion Date:
Remaining Time (Days)		

ACCEPTED BY CONTRACTOR:

By: _____

Date: _____

ENGINEER'S CERTIFICATION:

The undersigned certifies that work has been inspected and, to the best of their knowledge and belief, the quantities shown on this estimate are correct and the work has been performed in accordance with the contract documents.

APPROVED BY OWNER

By: _____

Date: _____

APPROVED BY ENGINEER

By: _____

Date: _____

DOCUMENT 00 62 16
CERTIFICATE OF INSURANCE

PART 1 GENERAL

1.1 PROCEDURE

A. For filing purposes, add Certificates of Insurance to the Contract Documents following this page.

END OF DOCUMENT

DOCUMENT 00 63 13
REQUEST FOR INTERPRETATION

DATED: _____

OWNER: Herriman City **CONTRACTOR:** _____
Address: 5355 West Herriman Main Street Address: _____
Herriman, UT 84096 _____

PROJECT: _____

Request for Interpretation of the specs/plans as follows:

Response:

Date Received by City:	Reviewed by:
Date of Response:	

DOCUMENT 00 63 36
FIELD ORDER

DATED:

OWNER: Herriman City
Address: 5355 West Herriman Main Street
Herriman, UT 84096

CONTRACTOR:
Address:

PROJECT: ***Herriman City*** **2019 New Restroom Facilities** **PROJECT NO:**

ENGINEER:

This Field Order provides for:

1. Reason for Change:

2. Description of Change:

3. Corrective Action:

4. Disposition:

The undersigned hereby proposes and agrees to furnish any and all labor, material, equipment, etc. in strict accordance with the requirements of the original contract documents except as specifically above noted or otherwise required in connection with the above proposed change. The original contract documents remain in full force and effect except as specifically modified herein.

The City and the Contractor hereby agree that the compensation set forth in this Change Order shall comprise the total direct and indirect costs due to Contractor for the work or changes defined in the Change Order.

ACCEPTED:_____ Date:_____
Resident Inspector

ACCEPTED:_____ Date:_____
Developer

APPROVED:_____ Date:_____
City Engineer

DOCUMENT 00 63 49
WORK DIRECTIVE CHANGE

NO.:

PROJECT: **DATE OF ISSUANCE:** _____

OWNER: Herriman City PROJECT NO.: _____

CONTRACTOR: _____

CONTRACT FOR: _____

ENGINEER: _____

You are directed to proceed promptly with the following change(s):

Description:

Purpose of Change Order:

Attachments: (list documents supporting change)

If a claim is made that the above change(s) have affected Contract Price or Contract Time, any claim for a Change Order based thereon will involve one of the following methods of determining the effect of the change(s).

Method of determining change in Contract Price:

☐ Time and materials
☐ Unit prices
☐ Cost plus fixed fee
☐ Other

Estimated increase(decrease) in Contract Price:
$_____
If the change involves an increase, the estimated amount is not to be exceeded without further authorization.

Method of determining change in Contract Time:

☐ Contractor's records
☐ Engineer's records
☐ Other

Estimated increase / decrease in Contract Time:
_____ days. If the change involves an increase, the estimated time is not to be exceeded without further authorization.

RECOMMENDED:

by _____
Engineer

AUTHORIZED:

by _____
Owner

DOCUMENT 00 63 63
CHANGE ORDER

DATED: _____
CONTRACTOR: _____
Address: _____ Change Order No.: _____
_____ Project No.: _____
PROJECT: ***Herriman City 2019 New Restroom Facilities*** Original Contract Amount: _____
OWNER: Herriman City

In preparing change orders, show in order as separate numbered paragraphs:
1. Reason for change 2. Description of change 3. Change in contract cost 4. Change in contract time

This Change order provides for:

1 Reason for change:
2 Description of change:
3 Change in contract cost:

Item #	Description of Changes	Quantity	Unit	Unit Price	Decrease in Contract Amount	Increase in Contract Amount
						$ -
						$ -
						$ -
	Subtotals:				$ -	$ -
	Net Change in Contract Price:					**$ -**

The amount of the contract will be increased decreased by the sum of: _____

$ - DOLLARS

The contract total including this and previous change orders will be: $ - DOLLARS

4 Change in Contract time: + Increase - Decrease 0 Days
New Completion Date: _____

The undersigned hereby proposes and agrees to furnish any and all labor, material, equipment, etc. in strict accordance with the requirements of the original contract documents except as specifically above noted or otherwise required in connection with the above proposed change. The original contract documents remain in full force and effect except as specifically modified herein.

The City and the Contractor hereby agree that the compensation set forth in this Change Order shall comprise the total direct and indirect costs due to Contractor for the work or changes defined in the Change Order.

APPROVED BY: _____ Date: _____
Contractor

APPROVED BY: _____ Date: _____
City Engineer

This document shall become a supplement to the Contract and all provisions will apply thereto.

DOCUMENT 00 65 16
CERTIFICATE OF SUBSTANTIAL COMPLETION

DATED:

OWNER: HERRIMAN CITY CORPORATION

TO: **CONTRACTOR**
Address:

PROJECT:

ENGINEER:

The Certificate of Substantial Completion applies to all Work under the Contract Documents or to the following specified parts thereof:

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on [DATE].

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of Contractor to complete all the Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by Contractor within ____ days of the above date of Substantial Completion.

The following documents are attached to and made a part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligations to complete the Work in accordance with the Contract Documents.

CITY ENGINEER: _____
(Signature)
Date: _____

WATER DEPARTMENT: _____
(Signature)
Date: _____

CONTRACTOR's Representative: _____
(Signature)

Date: _____

DOCUMENT 00 65 19
NOTICE OF FINAL ACCEPTANCE

CONTRACTOR:
Address:

PROJECT:

OWNER: ***HERRIMAN CITY CORPORATION***

A final acceptance of the WORK completed under the Contract indicated above has been made and all WORK has been found to be completed. All known changes to the WORK have been documented and approved at this time and to the best of our knowledge, information and belief. The WORK required by this Contract has been performed and completed in accordance with the approved DRAWINGS, SPECIFICATIONS and other CONTRACT DOCUMENTS. Final payment for the Contract has therefore been requested and should follow shortly.

Thank you for your effort and cooperation towards the successful completion of this WORK.

ENGINEER: _____
(Signature)

Date: _____

OWNER's Representative: _____
(Signature)

Date: _____

SECTION 00 65 19.16
WAIVER OF LIEN

FOR VALUABLE CONSIDERATION, the sufficiency of receipt of which is acknowledged, the undersigned acknowledges payment in full, including all approved change orders for which _____ of _____ has received payment, but excluding pending change order requests, or otherwise provided below and waives and releases any and all liens or claim or right and other rights afforded by law to protect unpaid subcontractors, laborers and suppliers of machinery tools, equipment, materials, supplies, services and other items used in construction against the project known as _____ _____ located at _____ and against the Owner.

THIS RELEASE is effective for all labor, tools equipment, supplies, services and the like furnished up to and including the ____ day of _____,20____ (excluding retainage withheld, if any) in the amount of $_____.

THIS RELEASE and the representations made above are made with the intent that the Project Owner or any other party who or whose property might be liable for any claims of the undersigned party may rely on the language of this instrument.

EXECUTED THIS _____ day of _____, 20____.

STATE OF UTAH)
§
COUNTY OF SALT LAKE)

_____
COMPANY NAME

_____
BY

_____
PRINTED NAME

_____
TITLE

On this _____ day of _____, 20____, personally appeared before me, a Notary Public, in and for said County and State,_____, known to me to be the person(s) described within. The person(s) described within executed the foregoing instrument, and duly acknowledged to me that s/he (they) executed the same, freely and voluntarily, for the uses and purposes therein mentioned.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above mentioned.

_____
NOTARY PUBLIC

SUPPLEMENTAL SPECIFICATION

SECTION 01 11 13
SUMMARY OF WORK

PART 1 GENERAL

1.1 WORK COVERED BY CONTRACT DOCUMENTS

A. Work of this Construction Contract ***comprises work under any, all, or any number of the schedules described in the Contract Documents as awarded to the Contractor.***

1.2 CONTRACT METHOD

A. Construct the Work under a single unit price contract.

B. Employ subcontractor[s] assigned by OWNER for: ***Not Applicable***

C. Relations and responsibilities between CONTRACTOR and any Subcontractors assigned by OWNER shall be as defined in the Conditions of the Contract. Assigned Subcontractors shall, in addition:

1. Furnish to CONTRACTOR bonds covering faithful performance of subcontracted work and payment of all obligations there under [when CONTRACTOR is required to furnish such bonds to owner.]
2. Purchase and maintain liability insurance to protect CONTRACTOR from claims for not less than the limits of liability which CONTRACTOR is required to provide to OWNER.

1.3 WORK BY OTHERS

A. Work of the Project [which will be] executed prior to start of Work of this Construction Contract, and which is specifically excluded from this Contract:

Not Applicable

B. Work of the Project which will be executed after completion of Work of this Construction Contract, and which is specifically excluded from this Contract:

Not Applicable

1.4 **FUTURE WORK**

A. ***Not Applicable***

1.5 **WORK SEQUENCE**

A. Liquidated Damages: Article 2.4 of the Agreement (Document 00 52 43).

1.6 **CONTRACTOR USE OF PREMISES**

A. CONTRACTOR shall limit use of premises [for Work, for storage, and for access,] to allow:

1. Residential Access

B. Coordinate use of premises under direction of OWNER.

C. Assume full responsibility for protection and safekeeping of products under this Construction Contract.

D. Obtain and pay for use of additional storage or work areas needed for operations under this Construction Contract.

1.7 **OWNER OCCUPANCY**

A. ***Not Applicable***

1.8 **PARTIAL OWNER UTILIZATION**

A. ***Not Applicable***

1.9 **PRE-ORDERED PRODUCTS**

A. ***Not Applicable***

1.10 **OWNER-FURNISHED PRODUCTS**

A. ***Not Applicable***

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF DOCUMENT

SUPPLEMENTAL SPECIFICATION

SECTION 01 14 00
WORK RESTRICTIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Conditions affecting construction.

1.2 PROJECT COORDINATION

A. CONTRACTOR is responsible for the coordination of all the work, whether performed by his own personnel, subcontractors, or others.

1.3 SAFETY REGULATIONS

A. CONTRACTOR shall be responsible to ensure that all excavation and construction of this project shall be in compliance with OSHA, state, and local safety regulations.

1.4 CLEANUP

A. Upon completion of construction, all scraps of lumber, forms, steel, wire, concrete materials, excess concrete spills, rocks, debris, excavation material, asphalt, etc., shall be removed from the area and disposed of by CONTRACTOR.

1.5 CONTRACT DRAWINGS

A. Where CONTRACTOR bases his bid upon quantities scaled from Contract Drawings, he shall verify true scale with ENGINEER prior to submitting his bid when scale is not shown or unclear.

1.6 INTERFERING STRUCTURES AND UTILITIES

A. CONTRACTOR shall exercise all possible caution to prevent damage to existing structures and utilities, whether above ground or underground. CONTRACTOR shall notify all utility companies concerned at least one week in advance of construction operations in which a utility's facilities may be involved. CONTRACTOR shall be responsible for coordination with utility companies for acceptable relocation methods (permanent or temporary) for the construction of this project. This shall include, but not be limited to, irrigation, water, telephone, cable, electric, and gas.

B. CONTRACTOR shall pothole utilities as necessary to determine potential utility conflicts. "Down time" or waiting for engineering evaluation of utility conflicts or grade issues, as well as modifications to existing utilities, shall be borne by CONTRACTOR without any additional costs to the OWNER or ENGINEER.

C. Any property or utilities damaged by the work shall be repaired or replaced in a condition equal to or better than the condition prior to the damage. Such repair or replacement shall be accomplished at CONTRACTOR's expense without additional compensation from the OWNER or ENGINEER.

D. All restorations made to utilities shall be inspected and approved by an authorized representative of the utility before being concealed by backfill or other Work

1.7 **CONSTRUCTION SURVEYING**

A. CONTRACTOR shall be responsible for all construction surveying on the project. CONTRACTOR shall preserve benchmarks and reference points. In the case of the destruction of an established benchmark or reference point, CONTRACTOR will be charged with the resulting relocation expense and shall be responsible for any mistakes that may be caused by their loss or disturbance.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

SUPPLEMENTAL SPECIFICATION

SECTION 01 22 00
MEASUREMENT AND PAYMENT

PART 1 MEASUREMENT AND PAYMENT

1.1 GENERAL

A. Payment for the various items of the Bid Schedule shall include all compensation to be received by CONTRACTOR for furnishing all tools, equipment, materials, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the Work in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of compliance with the regulations of OWNER and public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule for the various appurtenant items of work.

B. CONTRACTOR shall provide a breakdown of all lump sum bid items into the individual line items relating to the lump sum task, as specified by ENGINEER, prior to Notice to Proceed.

C. No additional payment will be made for rock excavation.

1.2 SECTION INCLUDES

A. Measurement and payment criteria applicable to portions of the Work performed under a unit price payment method.

B. Defect assessment and non-payment for rejected work.

1.3 AUTHORITY

A. ENGINEER will take all measurements and compute quantities accordingly.

B. Assist by providing necessary equipment, workers, and survey personnel as required.

1.4 UNIT QUANTITIES SPECIFIED

A. Quantities and measurements indicated in the Contract Documents are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by ENGINEER shall determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, CONTRACTOR shall provide the required quantities at the unit sum/prices contained within the bid schedule.

1.5 MEASUREMENT OF QUANTITIES

A. Measurement Devices By Weight:

1. Weigh Scales: Inspected, tested and certified by the applicable State Weights and Measures Department within the past year.
2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
3. Metering Devices: Inspected, tested and certified by the applicable State department within the past year.

B. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.

C. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

D. Measurement by Area: Measured by square dimension using mean length and width or radius.

E. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord, or as otherwise specified.

F. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

G. Areas damaged or disturbed by CONTRACTOR as a result of CONTRACTOR's failure to confine work activities or protect existing improvements shall not be included in the measurement to be eligible for payment.

H. Progress payments for lump sum items will be based on the percentage of Work complete.

1.6 PAYMENT

A. Payment Includes: Full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit, and all applicable taxes.

B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by ENGINEER multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

1.7 **INCIDENTAL WORK**

A. No separate measurement or payment for incidental work.

B. Incidental Work: Any work, materials or equipment that may be reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be supplied by CONTRACTOR at no additional cost to OWNER whether or not specifically referenced.

1.8 **TAXES**

A. It is the responsibility of CONTRACTOR to fully inform himself regarding all Federal, State and local tax laws, rules or regulations furnished under this Contract, including all exemption provisions and procedures.

B. All bid prices for material, equipment and labor for the Work under this Contract is inclusive of any tax for materials which are imposed by any governing agency to which the Work hereunder is subject. CONTRACTOR is solely responsible for assuring that all applicable taxes are included in his bid.

PART 2 BASE BID & BID ALTERNATE ITEMS

2.1 **RESTROOM FACILITY, Bid Item No. A1, B1, & 1**

A. Measurement shall be Lump Sum.

B. Payment for these items shall include all items necessary to install and complete the Arches Park Restroom Facility as required in the contract documents and the contract drawings including but not limited to:

1. Payment includes permit procurement and compliance for all local, state, and federal requirements, including but not limited to Herriman City Land Disturbance Permit and the Herriman City Building Permit.

2. Payment for connection to existing site utilities and any associated appurtences (i.e. water, sewer, gas, power, storm drain).

3. Payment for construction of the new restroom facility per the contract documents and drawings.

4. Payment for installation of new landscape, irrigation, and associated appurtences. Restoration of existing landscape, irrigation, and existing appurtences.

5. Payment for installation of new hardscape, sidewalk, and stamped concrete as shown in the contract documents and drawings. Restoration and maintenance of existing hardscape, sidewalk, stamped concrete or existing structures.

6. Payment for construction of all appurtences connection to all existing utilities, for all preparatory operations for the project, including but not limited to those items necessary for the project site: acquisition and payment of all permits; furnishing construction power and other utilities; furnishing, erecting, and maintenance of construction signs; mobilization and demobilization.

7. Payment also includes the cost of procuring and complying with State of Utah UPDES Permit, including submitting a Notice of Intent to the Utah State Division of Water Quality, paying the Permit fees, and preparing and submitting a Storm Water Pollution Prevention Plan for City and State approval to address any erosion control measures.

8. Payment also covers the cost of all items necessary to complete construction and restore the construction site to acceptable conditions. This includes, but is not limited to removal of temporary construction structures, clean up of all remaining materials on the construction site, and all other necessary clean-up measures to be taken as directed by the specifications and approved by the Engineer.

C. Payments will be made in accordance with percent of the project completion and as approved by the OWNER.

END OF SECTION

SUPPLEMENTAL SPECIFICATION

SECTION 01 31 13
COORDINATION

This specification changes a portion of APWA Standard Specification Section 01 31 13. All other provisions of the Section remain in full force and effect.

Add the following paragraph to Article 1.5.

1.5 COORDINATION WITH ADJACENT PROPERTY OWNER

F. Once each week hand deliver a written **"Construction Status Update Notice"** to all residents, businesses, schools and property owners adjacent to and affected by the Work. Notice shall be on CONTRACTOR's company letter head paper and be secured to door knob should occupants not be home. Obtain ENGINEER's review of notice prior to distribution. As a minimum the notice shall contain the following.

1. name and phone number of CONTRACTOR's representative for the project;
2. work anticipated for the next 7 days including work locations and work by subcontractors and utility companies;
3. rough estimate of construction schedule through end of project;
4. anticipated driveway approach closures;
5. anticipated water, sewer or power outages;
6. anticipated vehicular traffic impacts, rerouting or lane closures;
7. anticipated pedestrian impacts and sidewalk closures;
8. changes to public transportation bus routes; and
9. any other construction or work items which will impact or restrict the normal use of streets and amenities.

Failure to comply with this contract provision is considered grounds for project suspension per Article 15.1 of the General Conditions (Document 00 72 00).

Add the following Article to Part 1:

1.8 PUBLIC AGENCIES PERSONNEL TO CONTACT

A. Utility Companies: Utility companies generally require a minimum of 48 hours notice if their utility requires location, relocation or protection. Contact the following individuals to coordinate utility impacts on this project.

Utility	Contact	Contact Information	Utility Involvement
Herriman City General	*Blake J. Thomas, PE Herriman City Engineer*	*801-446-5323 bthomas@herriman.org*	*Existing City Facilities in Area*
Herriman City Culinary Water	*Justun Edwards Water Superintendent*	*801-446-5323 jedwards@herriman.org*	*Culinary Water Facilities*
Herriman City Roads and Streets	*Blake J. Thomas, PE Herriman City Engineer*	*801-446-5323 bthomas@herriman.org*	*Existing City Facilities in Area*
Herriman City Storm Drain	*Blake J. Thomas, PE Herriman City Engineer*	*801-446-5323 bthomas@herriman.org*	*Existing City Facilities in Area*
Jordan Valley Water Conservancy District	*Gordon Batt Jordan Valley Water Conservancy District Engineer*	*801-565-4300*	*Potential Existing Utilities in Area*
Sanitary Sewer	*Mike Foerster South Valley Sewer District*	*801-571-1166*	*Potential Existing Utilities in Area*
Gas Utilities	*Steve Eldredge Questar Gas*	*801-324-3954*	*Potential Existing Utilities in Area*
Irrigation	*Almon Butterfield Herriman Irrigation Co.*	*801-254-4841*	*Potential Existing Utilities in Area*
Telephone Utilities	*Arlene Denney Century Link*	*801-974-8130*	*Potential Existing Utilities in Area*
Power Utilities	*Louis Lopez Rocky Mountain Power*	*801-576-6227*	*Potential Existing Utilities in Area*

END OF SECTION

SUPPLEMENTAL SPECIFICATION

SECTION 01 33 00
SUBMITTAL PROCEDURES

This specification changes a portion of Section 01 33 00 in the Manual of Standard Specifications, 2017 Edition. All other provisions of the Section remain in full force and effect.

Add the following articles to part 1.

1.8 **TRANSMITTAL FORM**

A. Use the attached transmittal form (Form 01 33 00-1) when making any submittal to the ENGINEER.

B. Determine appropriate review due dates for each submittal and link the due date to the Progress Schedule (Section 01 32 16).

1.9 **SUBMITTAL REGISTER**

A. The Manual of Standard Specifications, 2017 Edition, and this Project Manual indicate submittals which are required for the Project. Using both of these publications, list the required submittals on the attached submittal register form (Form 01 33 00-2) [*Blank Submittal Register forms will be furnished by ENGINEER on request]*.

1. Identify the submittals which are for information only (see article 1.10).

2. Identify the submittals which require the ENGINEER's review or action (see article 1.11)

B. ***Submit the submittal register as the first submittal presented for review***.

1.10 **SUBMITTALS FOR INFORMATION ONLY**

A. Submittals identified in the Manual of Standard Specifications, 2017 Edition, or in the Project Manual which are not identified in this section are for information only and do not require review or action by ENGINEER or Resident Project Representative. Such submittals, however, will be monitored and spot checked. When spot checks indicate non-compliance, CONTRACTOR will be notified.

Add the following article to part 1.

1.11 SUBMITTALS REQUIRING REVIEW OR ACTION

A. The following table lists submittals which require ENGINEER's review or action. Transmit these submittals to the ENGINEER, or to the Resident Project Representative on site.

Table 1 - SUBMITTALS REQUIRING REVIEW OR ACTION

No.	Submittal	Section Reference	When Due
1	Submittal Register	01 33 00	Pre-construction conference
2	Preliminary Progress Schedule	00 72 00	Pre-construction conference
3	Quality Control Program	01 45 00	Pre-construction conference
4	Testing Agency Name, Address, Telephone No., Manager Name, Licenses and certificates	01 45 00	Pre-construction conference
5	Permits for Work	00 72 00	Prior to Starting Work
6	Progress Schedule	01 32 16	With Each Pay Request
7	Written Permission to use Private Citizen's Property and Water		24 Hours Prior to Use
8	Field Test Reports	01 45 00	End of Current Day
9	Laboratory Test Reports	01 45 00	Within 48 Hours
10	Construction Surveyor Name, Address, Registration No.	01 71 23	72 Hours Prior to Starting Work
11	Untreated Base Course Gradation	32 11 23	Prior to Use
12	Passing Untreated Base Course Compaction Test Control Reports	32 05 10	Daily as UTBC is placed
13	Depth of Backfill Lift if greater than specified	33 05 20	Prior to Change
14	Select Fill Mix Design		Prior to Use
15	Asphalt Concrete Mix Design Supplier's Mix No.	32 12 05	Prior to Use
16	Asphalt Concrete Batch Delivery Ticket		Upon Delivery to Site
17	Passing Asphalt Concrete Compaction Test Control Reports	32 12 05	Daily as Asphalt is placed
18	Concrete Mix Design Supplier's Mix No.	03 30 04	Prior to Use
19	Concrete Batch Delivery Ticket	03 30 05	Upon Delivery to Site
20	Portland Cement Concrete Source Data and Supplier's Mix No.	32 13 13	Prior to Use
21	Water System Product Data	33 11 00	Prior to Installation
22	Waterproofing	07 19 00	Prior to Installation
23	Water System Disinfection Report	33 13 00	Prior to Water Line Use
24	Pipeline Commissioning	33 08 00	Prior to System Use
25	Portland Cement Concrete Quality Control Test Reports	32 13 13	Daily as applicable

No.	Submittal	Section Reference	When Due
26	Portland Cement Concrete Batch Delivery Ticket	32 13 13	Upon Delivery to Site
27	Electrical Shop Drawings	26 05 00	Within 15 days after contract award
28	Electrical Materials	26 05 00	Within 15 days after contract award
29	Electrical Testing	26 05 00	Prior to Use
30	Electrical Operating Instruction Manuals	26 05 00	Prior to Use
31	Electrical System Product Data	26 05 00	Prior to Installation
32	Operator Manuals	01 78 23	Prior to Use
33	Water Line Commissioning Test Reports	33 08 00	Prior to Final Payment
34	Valves, Meters, and Appurtenances	33 11 00, 33 12 16, 33 12 19, 33 12 33	Prior to Installation
35	Certification of Compliance and Request for Final Inspection	00 72 00	5 Working Days Prior to Substantial Completion
36	Evidence of Payment to Suppliers and Subcontractors	00 72 00	Prior to Final Payment
37	As-Built Drawings/Redlines	01 78 39	Prior to Final Payment
38	Summary Reports	01 45 00	Prior to Final Payment

NOTES:

1. Section references listed in this table but not found in this Project Manual may be found in the APWA Manual of Standard Specifications.

SUPPLEMENTAL SPECIFICATION

SECTION 01 33 00
SUBMITTAL PROCEDURES

This specification changes a portion of Section 01 33 00 in the Manual of Standard Specifications, 2017 Edition. All other provisions of the Section remain in full force and effect.

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NOTES:

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TRANSMITTAL FORM	DATE	[ ] NEW SUBMITTAL [ ] RESUBMITTAL

Section I REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the CONTRACTOR)

TO	FROM	TRANSMITTAL No. PREVIOUS TRANSMITTAL No.
SPECIFICATION SECTION NUMBER (See instructions)	CONTRACT TITLE	CONTRACT No.

SUBMITTAL ITEM No.	DESCRIPTION OF ITEM SUBMITTED (Type, size, model number, etc.)	SAMPLE OR CERTIFICATE (See instructions)	NO. OF COPIES	CONTRACT REFERENCE DOCUMENT		VARIATION (See instructions)	ENGINEER REVIEW CODE (See instructions)
				SPEC. PARA. No.	DRAWING SHEET No.		
a.	b.	c.	d.	e.	f.	g.	h.

REMARKS	I certify that the above submitted items have been reviewed in detail and are correct and conform with the contract Drawings and specifications except as otherwise noted. _____ NAME AND SIGNATURE OF CONTRACTOR

Section II OWNER'S ACTION This section will be completed by the ENGINEER)

ENCLOSURES RETURNED (List by Item No.)	SIGNATURE OF REVIEWING AGENT	DATE

FORM 01 33 00-1 (Read Instructions on the reverse side prior to initiating this form)

INSTRUCTIONS

GENERAL

1. Form is self-transmittal. Letter of transmittal is not required.
2. Submittals requiring expeditious handling will be submitted individually on this Form.
3. ENGINEER's review of submittals does not release or relieve CONTRACTOR from complying with all requirements of the Contract Documents.

SECTION I

1. TRANSMITTAL No: Number each transmittal consecutively in the space entitled "Transmittal No.". This number will identify each submittal.
2. PREVIOUS TRANSMITTAL No: Mark the box for resubmittal and insert the transmittal number of last submission as well as the new submittal number in the spaces provided. Each resubmittal will become a new transmittal.
3. SPECIFICATION SECTION No.: Cover only one specification section with each transmittal.
4. Column "a": For each entry on this form, the "SUBMITTAL ITEM No." will be the same as the SUBMITTAL ITEM No. indicated on the Submittal Register (Form 01335-2).
5. Column "c": When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate".
6. Column "g": CONTRACTOR will place a check mark in the "Variation" column when a submittal is not in accordance with the plans and specifications - also, a written statement to that effect shall be included in the space provided for "Remarks" or on a separate page.
7. Column "h": For each item reviewed, ENGINEER shall assign action codes as follows.

A. No Exceptions Taken.
B. Make Corrections Noted. Resubmission not required.
C. Submit Specified Item.
D. Rejected.
E. Resubmit
F. Do Not Resubmit. Receipt acknowledged.
G. Will be returned by separate correspondence.
H. Other (Specify).

SUBMITTAL REGISTER				PROJECT TITLE LOCATION CONTRACTOR											No.						
SCHEDULED ACTIVITY	SUBMITTAL ITEM No.	SPECIFICATION PARAGRAPH NUMBER	DESCRIPTION OF SUBMITTAL	TYPE OF SUBMITTAL											REVIEW ACTION	CONTRACTOR NEED DATES			ENGINEER ACTION DATES		OTHER
				SAMPLES	SHOP DRAWINGS	PARTS LIST	PRODUCT DATA	DESIGN DATA	SPECIFICATIONS	CERTIFICATES	INSTRUCTIONS	TESTING RESULTS	O & M MANUAL	OTHER	REVIEW REQUIRED BY	SUBMITTAL DATE	APPROVAL NEEDED BY	MATERIAL NEEDED BY	DATE RECEIVED	ACTION CODE	

FORM 01 33 00-2

INSTRUCTIONS

GENERAL

1. CONTRACTOR to Complete Form: Review the Contract Documents to insure completeness. Expand general category listings. Show individual entries on this form for each item.

    a. As an example, a general category would be "Plumbing Fixtures" which the CONTRACTOR is to breakdown into individual entries such as "Toilet P-1, Lavatory P-2, etc." Complete the Submittal Register, attach it to Form 01335-1 and submit it to ENGINEER.

2. Resubmittals: If a submittal is returned for correction, provide a new Submittal Identification Number. Identify the number on the submittal register and resubmit the information for review. Do not amend the data already contained on the submittal register.

SUBMITTAL REGISTER

1. SCHEDULED ACTIVITY: If an activity on the Progress Schedule is assigned to the submittal, place the schedule activity number in the "SCHEDULED ACTIVITY" column.

2. SUBMITTAL ITEM No.: Assign to each entry on the Submittal Register a sequential number in the "SUBMITTAL IDENTIFICATION (ITEM NUMBER)" column.

3. REVIEW ACTION: The "REVIEW ACTION" column identifies technical review responsibility of submittal. Review of all products and materials is the CONTRACTOR's responsibility; however, certain specified submittals will also require ENGINEER's review.

    a. If REVIEW ACTION Column is Blank: Identified submittal shall be approved by the CONTRACTOR and then submitted to the ENGINEER for information.

    b. If the "ENGINEER" is Identified in the REVIEW ACTION Column: Identified submittals shall be first approved by the CONTRACTOR and then submitted to the ENGINEER for review.

4. ENGINEER ACTION DATES: This column is for ENGINEER's use to record date submittal was received and the action code assigned in the submittal review process.

END OF SECTION

SUPPLEMENTAL SPECIFICATION

SECTION 01 43 00
QUALITY ASSURANCE

Add Paragraph 1.6, Inspection and Testing Laboratory Services, and 1.7, Manufacturers' Field Services and Reports, as follows:

1.6 INSPECTION AND TESTING LABORATORY SERVICES

A. CONTRACTOR shall employ and pay for the services of a qualified independent testing consultant, approved by the OWNER, to perform specified services for the testing of:

Soils Compaction Control	Material Aggregate Control
Concrete Control	Paving and Asphalt Surfacing Control

B. Inspections, tests, and other services specified in individual specification Sections will be accomplished under the direction of ENGINEER.

C. Reports will be submitted through ENGINEER in accordance with Section 01 35 10, in duplicate except as noted otherwise in Section 01 33 00, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

D. Furnish samples of materials, design mix, equipment, tools, storage and assistance as requested.

E. Notify Engineer 48 hours prior to expected time for testing operations. Make arrangements with independent firm to perform quality control services. Provide Firm SOQ to OWNER for acceptance and approval prior to work. OWNER may request alternate testing firm at any time during project work as deemed solely necessary by OWNER at no additional cost to OWNER.

F. Retesting required because of non-conformance to specified requirements shall be performed under the direction of ENGINEER. Payment for retesting will be borne by CONTRACTOR.

1.7 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-

up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit report in duplicate within 30 days of observation to ENGINEER for review.

END OF SECTION

SUPPLEMENTAL SPECIFICATION
SECTION 01 45 00
QUALITY CONTROL

This specification changes a portion of Section 01 45 00 of the Manual of Standard Specifications, 2017 Edition. All other provisions of the Section remain in full force and effect.

Add the following Article to Part 1.

1.7 QUALITY CONTROL PROGRAM

A. **Quality Control Program**: Provide a quality control program which includes procedures and organization so equipment, workmanship, fabrication, construction, operations, and inspections comply with the Contract Documents.

B. **Quality Control Program Manager Qualifications**:

1. Not CONTRACTOR's work or site superintendent.
2. Quality control experience with projects of similar type and magnitude.
3. Authorized as CONTRACTOR's representative for all quality control and quality assurance matters.

C. **Quality Control Program Manager Responsibilities**:

1. Manage and supervise quality control plan and quality control surveillance personnel.
2. Verify that testing procedures comply with contract requirements.
3. Verify that facilities and testing equipment are available and comply with testing standards.
4. Check test instrument calibration data against certified standards.
5. Verify that recording forms, including all the documentation requirements, have been prepared.
6. Prepare copies of each test result with all necessary data recorded and with documentation and computations compiled.
7. Provide more testing, if, in ENGINEER's opinion, work is not being adequately controlled.
8. Immediately report any non-compliance of materials and mixes to ENGINEER and CONTRACTOR.
9. When an out-of-tolerance condition exists, perform additional control testing until tolerance is attained.
10. Correlate CONTRACTOR's assurance testing program (Section 01 43 00) with ENGINEER's acceptance testing program (Section 01 35 10).

END OF SECTION

SUPPLEMENTAL SPECIFICATION

SECTION 01 71 23.16
CONSTRUCTION SURVEYING

This specification changes a portion of APWA Standard Specification Section 01 71 23. All other provisions of the Section remain in full force and effect.

Add Section 1.4, as follows:

1.4 OWNER SUPPLIED SURVEYING

A. All construction surveying required for this project shall be supplied by OWNER.

Replace Section 3.1 Project Survey Requirements as follows:

3.1 STAKING PROVIDED

A. Any work performed by CONTRACTOR without OWNER-provided survey information shall be performed at CONTRACTOR's own risk.

B. OWNER will provide a one-time location and layout by instrumentation and similar appropriate means to include but not limited to the following:

1. ***[DESCRIPTION]***

C. Any CONTRACTOR requested staking in addition to the initial one-time staking provided by OWNER's surveyor will be considered as restaking. CONTRACTOR shall pay all restaking costs to the surveyor, at no additional cost to OWNER.

Add Paragraph 3.2 Notice Requirements, as follows:

3.2 NOTICE REQUIREMENTS

A. CONTRACTOR shall provide a 48-hour (2 working-day) minimum notice for all requested staking or restaking.

Add Paragraph 3.3 Restaking, as follows:

3.3 RESTAKING

A. CONTRACTOR shall provide a 48-hour (2 working day) minimum notice for all requested restaking.

B. All CONTRACTOR requested restaking will be performed on a time and materials basis at the following rates.

2 person survey crew	$130.00 per hour
3 person survey crew	$120.00 per hour
1 person computation and/or CADD Technician	$ 65.00 per hour

Add Paragraph 3.4 Contractor Initiated Survey, as follows:

3.4 CONTRACTOR INITIATED SURVEY

A. All CONTRACTOR initiated survey work will be performed as indicated within Section 3.3 Restaking, of this document.

END OF SECTION

SUPPLEMENTAL SPECIFICATION

SECTION 01 76 00
PROTECTION AND RESTORATION OF EXISTING FACILITIES

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. This section is intended to include requirements associated with protection and restoration of existing facilities such as underground facilities and surface improvements.

1.2 NOTIFICATION OF UTILITIES

A. Utilities are to be contacted by CONTRACTOR prior to any excavation activities requesting locations on underground utilities.

1.3 INTERRUPTION TO UTILITIES

A. Any underground facilities located by utilities or indicated in Contract Documents shall be treated according to paragraph 4.3.A of General Conditions.

B. Any underground facilities not located by utilities and not indicated in Contract Documents shall be treated according to paragraph 4.3.B of General Conditions.

C. Exact locations and depths of all underground utilities shall be verified, by uncovering, prior to commencing any Work activities. When such exploratory excavations show the underground utility locations as indicated in Contract Documents to be in error, the CONTRACTOR shall so notify the ENGINEER in writing.

D. Where utilities are to be relocated, CONTRACTOR shall make proper application and notify ENGINEER of specified time and conditions of necessitated Work.

E. All restorations made to utilities shall be inspected and approved by an authorized representative of the utility before being concealed by backfill or other Work.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION (Not Used)

END OF SECTION

Herriman City
2019 New Restrooms Facilities

PROJECT SPECIAL PROVISIONS

SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete formwork.

B. Floors and slabs on grade.

C. Concrete reinforcement.

D. Joint devices associated with concrete work.

E. Miscellaneous concrete elements, including equipment pads, light pole bases, thrust blocks, and manholes.

F. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03 3511 - Concrete Floor Finishes: Densifiers, hardeners, applied coatings, and polishing.

B. Section 07 9200 - Joint Sealants: Products and installation for sealants for saw cut joints and isolation joints in slabs.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; American Concrete Institute International; 2010.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete; American Concrete Institute International; 2010 (Errata 2012).

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International; 2004 (Errata 2007).

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International; 2000.

F. ACI 305R - Hot Weather Concreting; American Concrete Institute International; 2010.

G. ACI 306R - Cold Weather Concreting; American Concrete Institute International; 2010.

H. ACI 308R - Guide to Curing Concrete; American Concrete Institute International; 2001 (Reapproved 2008).

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International; 2011.

J. ACI 347 - Guide to Formwork for Concrete; American Concrete Institute International; 2004.

K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Billet-Steel Bars for Concrete Reinforcement; 2015.

L. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2013.

M. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2014.

N. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

O. ASTM C150/C150M - Standard Specification for Portland Cement; 2012.

P. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

Q. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

R. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

S. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2012.

T. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2013.

U. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2013.

V. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2014.

W. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2014.

X. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.

Y. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers; 1996 (Reapproved 2008).

Z. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2011.

AA. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2011.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
   1. For curing compounds, provide data on method of removal in the event of incompatibility with floor covering adhesives.
   2. For Recycled Content:
      a. Indicate recycled content for each type of product provided under work of this section; indicate percentage of pre-consumer and post-consumer recycled content per unit of product.
      b. If recycled content product is part of an assembly, indicate the percentage of recycled content product in the assembly by weight.

C. Mix Design: Submit proposed concrete mix design.

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

E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

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

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

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

PART 2 PRODUCTS

2.01 FORMWORK

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

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Coating: Biobased release agent that will not adversely affect concrete or interfere with application of coatings.
      a. Biobased Content:
         1) Concrete Release Fluids: Provide minimum 87% Biobased content.

b. Toxicity/IEQ: Low VOC.

2. Form Ties: Cone snap type that will leave no metal within 1-1/2 inches (38 mm) of concrete surface.

2.02 REINFORCEMENT

A. Steel Reinforcement General:
   1. Recycled Content: Minimum [10] percent post-consumer recycled content, or minimum [40] percent pre-consumer recycled content.

B. Reinforcing Steel #4 or smaller: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished.

C. Reinforcing Steel #6 or larger: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.03 CONCRETE MATERIALS

A. Provided cement and aggregate materials extracted/harvested and manufactured within a 500 mile radius from the project site.

B. Cement: ASTM C150, as noted on structural drawings, Portland type.

C. Fine and Coarse Aggregates: ASTM C 33.
   1. Recycled porcelain, concrete, stone, or other recycled content material conforming to requirements of mix design.
   2. Recycled Content: Minimum [10] percent post-consumer recycled content, or minimum [40] percent pre-consumer recycled content.
   3. Provide materials extracted/harvested and manufactured within a 500 mile radius from the project site.

D. Fly Ash: ASTM C618, Class C or F.
   1. Recycled Content: Minimum [20] percent pre-consumer recycled content.

E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.
   1. Recycled Content: Minimum [20] percent pre-consumer recycled content.

F. Water: Clean and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.

D. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

E. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

F. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

G. Accelerating Admixture: ASTM C494/C494M Type C.

H. Retarding Admixture: ASTM C494/C494M Type B.

I. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; stated by manufacturer as suitable for

installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.

1. Installation: Comply with ASTM E1643.
2. Accessory Products: Vapor retarder manufacturer's recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
3. Products:
    a. Fortifiber Building Systems Group; Moistop Ultra 15: www.fortifiber.com.
    b. Insulation Solutions, Inc; Viper VaporCheck II 15-mil (Class A): www.insulationsolutions.com.
    c. Stego Industries, LLC; Stego Wrap 15-mil Vapor Barrier: www.stegoindustries.com.
    d. W.R. Meadows, Inc.; PERMINATOR Class A - 15 mils (0.38 mm): www.wrmeadows.com.

B. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
1. ASTM C1107/C1107M; Grade A, B, or C.

C. Non-Shrink Epoxy Grout: Moisture-insensitive, two-part; consisting of epoxy resin, non-metallic aggregate, and activator.

2.06 BONDING AND JOINTING PRODUCTS

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

B. Epoxy Bonding System:
1. Complying with ASTM C881/C881M and of Type required for specific application.

C. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.

D. Slab Contraction Joint Device: Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.

E. Slab Construction Joint Devices: Combination keyed joint form and screed, galvanized steel, with minimum 1 inch (25 mm) diameter holes for conduit or rebars to pass through at 6 inches (150 mm) on center; ribbed steel stakes for setting.
1. Provide removable plastic cap strip that forms wedge-shaped joint for sealant installation.

2.07 CURING MATERIALS

A. Curing and Sealing Compounds, General: All compounds used shall provide a positive bond between flooring adhesives and the curing/sealing membrane in accordance with ASTM C1315

B. Evaporation Reducer: Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

C. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
1. Toxicity/IEQ: Low VOC.

D. Curing Compound, Non-dissipating: Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309.
1. Vehicle: Water-based.
2. Solids by Mass: 18 percent, minimum.
3. VOC Content: OTC compliant.

E. Water: Potable, not detrimental to concrete.

2.08 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.
   2. Fly Ash Content: Maximum 50 percent of cementitious materials by weight.

2.09 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

C. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.

3.03 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

3.04 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

D. Ensure reinforcement, inserts, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.05 SLAB JOINTING

A. Place joints as indicated on the structural drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.

D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch (5 mm) thick blade and cut at least 1 inch (25 mm) deep but not less than one quarter (1/4) the depth of the slab.

E. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.06 SEPARATE FLOOR TOPPINGS

A. Prior to placing floor topping, remove the existing concrete to a depth as required by the manufacturer and deleterious material. Broom and vacuum clean.

B. Remove and replace concrete which may contain foreign material per the topping manufacturer

C. Place required dividers, edge strips, reinforcing, and other items to be cast in.

D. Apply bonding agent to substrate in accordance with manufacturer's instructions.

E. Place concrete floor toppings to required lines and levels.

F. Screed toppings level, maintaining surface flatness of maximum 1:1000.

3.06 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Minimum F(F) Floor Flatness and F(L) Floor Levelness Values:
   1. Exposed to View and Foot Traffic: F(F) of 20; F(L) of 15, on-grade only.
   2. Under Thick-Bed Tile: F(F) of 20; F(L) of 15, on-grade only.
   3. Under Carpeting: F(F) of 25; F(L) of 20, on-grade only.
   4. Under Thin Resilient Flooring and Thinset Tile: F(F) of 35; F(L) of 25, on-grade only.

B. Measure F(F) and F(L) in accordance with ASTM E1155, within 48 hours after slab installation; report both composite overall values and local values for each measured section.

C. Correct the slab surface if composite overall value is less than specified and if local value is less than two-thirds of specified value or less than F(F) 13/F(L) 10.

D. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.07 CONCRETE FINISHING

A. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch (6 mm) or more in height.

B. Exposed Form Finish: Rub down or chip off and smooth fins or other raised areas 1/4 inch (6 mm) or more in height. Provide finish as follows:
   1. Smooth Rubbed Finish: Wet concrete and rub with carborundum brick or other abrasive, not more than 24 hours after form removal.

C. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains as indicated on drawings.

3.08 CURING AND PROTECTION

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

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Surfaces Not in Contact with Forms:
   1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.
   2. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water-fog spray.

a. Spraying: Spray water over floor slab areas and maintain wet.

3. Final Curing: Begin after initial curing but before surface is dry.

3.09 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

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

3.10 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

3.11 WASTE MANAGMENT

A. As specified in Section 01 7419 - Construction Waste Management and Disposal and as follows:

B. Formwork: Reuse forms to greatest extent possible without damaging structural integrity of concrete and without damaging aesthetics of exposed concrete.

C. Moisture curing: Prevent water run-off.

D. Hardened, cured waste concrete:

1. Hardened, cured waste concrete may be crushed and reused as fill or as a base course for pavement.
2. Hardened, cured waste concrete may be used as aggregate in concrete mix if approved by Engineer.

END OF SECTION

SECTION 03 3533
STAMPED CONCRETE FINISHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stamping of new full-depth concrete.

B. Coloring of stamped concrete.

1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete mix design; bonding and chemical admixtures; mixing; placement; finishing of concrete surface to tolerance: floating, troweling, and similar operations; frequency and treatment of control joints.

1.03 REFERENCE STANDARDS

A. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016, with Editorial Revision (2016).

B. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.

C. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete; 2011.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Design Samples: Submit samples for approval; demonstrate pattern, color, and finishing, using specified materials and techniques, applied to plywood.
   1. Number of Samples: One of each color and pattern combination specified.
   2. Size: 24 by 24 inches (610 by 610 mm).

D. Certificates: Certify that products of this section meet or exceed specified requirements and are suitable for intended application.

1.05 MOCK-UPS

A. Construct mock-up(s) of stamped concrete to serve as basis for evaluation of workmanship.
   1. Number of Mock-Ups to be Prepared: One.
   2. Use same materials and methods for use in the work.
   3. Use approved design samples as basis for mock-ups.
   4. Record technique, timed procedures and material used.
   5. Locate where directed.
   6. Minimum Size: 4 by 4 feet (1220 by 1220 mm).

B. Obtain approval of mock-up by Architect before proceeding with work.

C. Retain mock-up(s) until completion of work for use as quality standard.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store and handle materials in accordance with manufacturer's instructions.

C. Keep materials in manufacturer's original, unopened containers and packaging until application.

D. Store materials in clean, dry area indoors and out of direct sunlight.

E. Keep materials from freezing.

F. Protect materials during storage, handling, and application to prevent contamination or damage.

1.07 FIELD CONDITIONS

A. Do not install materials when air and surface temperatures are below 55 degrees F (13 degrees C) or above 80 degrees F (27 degrees C).

B. Do not install materials when rain, snow, or excessive moisture is expected during application or within 24 hours after application.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Stamping and Coloring Materials:
   1. BRICKFORM; ____: www.brickform.com/#sle.
   2. Concrete Solutions by Rhino Linings; _____: www.concretesolutions.com/#sle.
   3. The Bomanite Company; ___: www.bomanite.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 STAMPED CONCRETE APPLICATIONS

A. Full Depth Stamped Concrete Slab - Type 1: Patterned new concrete.
   1. Application(s): All indicated exterior locations.
   2. Pattern: match existing.
   3. Color: Match Existing.
   4. As last step, apply combination curing compound / clear sealer.

2.03 FULL-DEPTH CONCRETE SLAB MATERIALS

A. See other section(s) for concrete design mix, mixing, forming, and reinforcement.

B. Slump: 4.0 inches (101.6 mm) maximum.

C. Do not use calcium chloride or admixtures containing calcium chloride.

D. Aggregates: Use non-reactive fine and coarse aggregates free from deleterious material and complying with ASTM C33/C33M.

2.04 STAMPING MATERIALS

A. Stamping Mats: Mat type imprinting tools for texturing freshly placed concrete, in pattern and texture to achieve required surface profile and design.
   1. Mat Composition: Polyurethane.

B. Release Agent: Bond breaker compound capable of releasing stamping forms from concrete without creating surface defects or leaving any residue; type as recommended by stamping mat manufacturer; compatible with concrete, form materials and specified coloring agents.

2.05 INTEGRAL COLORING AGENTS

A. Concrete Pigment: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.
   1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
   2. Packaging: If pigments are to be added to mix at site, furnish pigments in premeasured disintegrating bags to minimize job site waste.
   3. Color(s): Match existing.
   4. Products:
      a. BRICKFORM; BRICKFORM Powdered Color: www.brickform.com/#sle.
      b. The Bomanite Company; _____: www.bomanite.com/#sle.
      c. Substitutions: See Section 01 6000 - Product Requirements.

2.06 ACCESSORY MATERIALS

A. Curing and Sealing Compound: Clear, non-yellowing, non-staining, breathable, UV stable curing agent and sealer, complying with ASTM C1315 and compatible with all components of stamped concrete systems.

B. Concrete Cleaner: Biodegradable cleaning and neutralizing agent for removal of curing compounds.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine surfaces and areas to receive stamped concrete.

B. Verify that utility penetrations and peripheral work are complete.

C. Notify Architect of conditions that would adversely affect application or subsequent use.

D. Do not begin preparation or application until unacceptable conditions are corrected.

3.02 PREPARATION

A. Protect adjacent surfaces, areas, adjoining walls, and landscaping from overspray, blown dry materials, and damage due to work of this section.

3.03 FULL-DEPTH CONCRETE SLABS INSTALLATION

A. See other section(s) for concrete forming and placement.

3.04 STAMPING

A. Match approved mock-ups for pattern, color, texture, and workmanship.

B. Use stamping mats to create patterns in concrete as indicated on drawings; comply with manufacturer's recommendations and instructions.

C. Use release agent to prevent damage to concrete surface or creation of bugholes during mat removal.

D. After removal of stamping mats, make minor surface repairs as required.

3.05 CURING

A. Protect recently placed materials from premature drying, excessive hot or cold temperatures and mechanical injury until fully cured.

3.06 SURFACE TREATMENTS

A. Match approved mock-ups for pattern, color, texture, and workmanship.

B. Wait at least 28 days before applying any surface treatment materials or mechanical finishing.

C. Clean curing agent residue off surface prior to application of surface treatment materials.
   1. Apply concrete cleaner in accordance with manufacturer's instructions to remove excess form release agent, efflorescence, cement scale and curing agents.

D. Sealer/Coating Application: Apply uniformly over entire surface in accordance with manufacturer's instructions.

3.07 PROTECTION

A. Do not allow traffic on finished surfaces for the following periods after application:
   1. Foot Traffic: Minimum 24 hours.
   2. Heavy Traffic: Minimum 72 hours.

B. Protect finished work from damage during construction and ensure that, except for normal weathering, work will be without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 04 2000

UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Block.

B. Clay Facing Brick.

C. Common Brick.

D. Mortar and Grout.

E. Reinforcement and Anchorage.

F. Flashings.

G. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 04 0511 - Mortar and Masonry Grout.

B. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.

C. Section 07 2100 - Thermal Insulation: Insulation for cavity spaces.

D. Section 07 6200 - Sheet Metal Flashing and Trim: Through-wall masonry flashings.

E. Section 07 9200 - Joint Sealants: Sealing control and expansion joints.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2016.

C. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2009a (Reapproved 2014).

D. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2017.

E. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2017.

F. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.

G. ASTM C91/C91M - Standard Specification for Masonry Cement; 2012.

H. ASTM C140/C140M - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units; 2017a.

I. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar; 2017.

J. ASTM C150/C150M - Standard Specification for Portland Cement; 2018.

K. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2006 (Reapproved 2011).

L. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2017a.

M. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2014a.

N. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2011.

O. ASTM C476 - Standard Specification for Grout for Masonry; 2018.

P. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2017.

Q. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2016.

R. ASTM C1072 - Standard Test Method for Measurement of Masonry Flexural Bond Strength; 2013, with Editorial Revision (2014).

S. ASTM C1148 - Standard Test Method for Measuring the Drying Shrinkage of Masonry Mortar; 1992a (Reapproved 2014).

T. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms; 2016.

U. ASTM C1634 - Standard Specification for Concrete Facing Brick; 2017.

V. ASTM E514/E514M - Standard Test Method for Water Penetration and Leakage Through Masonry; 2014a.

W. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.

X. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.

Y. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

D. Manufacturer's Certificate: Certify that water repellent admixture manufacturer has certified masonry unit manufacturer as an approved user of water repellent admixture in the manufacture of concrete block.

E. Test Reports: Concrete masonry manufacturer's test reports for units with integral water repellent admixture.

1.06 QUALITY ASSURANCE

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

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.07 MOCK-UP

A. Construct a masonry wall as a mock-up panel sized 8 feet (2.4 m) long by 6 feet (1.8 m) high; include mortar, accessories, structural backup, and flashings (with lap joint, corner, and end dam) in mock-up.

B. Locate where directed.

C. Mock-up may remain as part of the Work.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on the drawings for specific locations.
   2. Load-Bearing Units: ASTM C90, normal weight.

a. Hollow block, as indicated.
b. Exposed Faces: Special color and texture, as follows: Honed/Colored as selected from manufacturers full range.
c. Manufacturers:
1) The Concrete Products Group; Spec-Brik: www.concreteproductsgroup.com/#sle
2) The Concrete Products Group; Polished and Textured Collection: www.concreteproductsgroup.com/#sle
3) Sunroc Corporation - A Clyde Company: www.sunroc.com/northern-utah/masonry/.

2.02 BRICK UNITS

A. Manufacturers:
1. Belden Brick; Belcrest: www.beldenbrick.com.
2. Boral Bricks, Inc; www.boralbricks.com.
3. Endicott Clay Products Co; www.endicott.com.
4. General Shale Brick; www.generalshale.com.

B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.
1. Color and texture to match Architect's sample.
2. Color and texture: TBD.
3. Nominal size: As indicated on drawings.
4. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

C. Building (Common) Brick: ASTM C62, Grade SW; solid units.
1. Nominal size: As indicated on drawings.

2.03 MORTAR AND GROUT MATERIALS

A. Masonry Cement: ASTM C91/C91M, Type N.
1. Colored Mortar: Premixed cement as required to match Architect's color sample.

B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
1. Not more than 0.60 percent alkali.

C. Hydrated Lime: ASTM C207, Type S.

D. Mortar Aggregate: ASTM C144.

E. Grout Aggregate: ASTM C404.

F. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
1. Color(s): As selected by Architect from manufacturer's full range.
2. Manufacturers:
a. Davis Colors; www.daviscolors.com.
b. Solomon Colors; www.solomoncolors.com/sle.

G. Water: Clean and potable.

H. Integral Water Repellent Admixture for Mortar: Polymeric liquid admixture added to mortar at the time of manufacture.
1. Use only in combination with masonry units manufactured with integral water repellent admixture.
2. Use only water repellent admixture for mortar from the same manufacturer as water repellent admixture in masonry units.
3. Meet or exceed performance specified for water repellent admixture used in masonry units.

2.04 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:

1. Blok-Lok Limited; www.blok-lok.com.
2. Hohmann & Barnard, Inc; 2-Seal Tie: www.h-b.com/sle.
3. WIRE-BOND: www.wirebond.com.

B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa), deformed billet bars; galvanized.

C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.

D. Single Wythe Joint Reinforcement: Truss or ladder type; ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.

E. Multiple Wythe Joint Reinforcement: Truss type; fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.

F. Adjustable Multiple Wythe Joint Reinforcement: Truss type with adjustable ties or tabs spaced at 16 in (406 mm) on center and fabricated with moisture drip; ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/153M, Class B; 0.1875 inch (4.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods and adjustable components of 0.1875 inch (4.8 mm) wire; width of components as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from each masonry face.
1. Vertical adjustment: Not less than 2 inches (50 mm).
2. Seismic Feature: Provide lip, hook, or clip on extended leg of wall ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch (3.8 mm) diameter.
3. Insulation Clips: Provide clips at tabs or ties designed to secure insulation against outer face of inner wythe of masonry.

G. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face.

H. Masonry Veneer Anchors: 2-piece anchors that permit differential movement between masonry veneer and structural backup, hot dip galvanized to ASTM A 153/A 153M, Class B.
1. Anchor plates: Not less than 0.075 inch (1.91 mm) thick, designed for fastening to structural backup through sheathing by two fasteners; provide design with legs that penetrate sheathing and insulation to provide positive anchorage.
2. Wire ties: Manufacturer's standard shape, 0.1875 inch (4.75 mm) thick.
3. Vertical adjustment: Not less than 3-1/2 inches (89 mm).
4. Seismic Feature: Provide lip, hook, or clip on end of wire ties to engage or enclose not less than one continuous horizontal joint reinforcement wire of 0.1483 inch (3.8 mm) diameter.

2.05 FLASHINGS

A. Copper/Rubberized Asphalt Flashing: 3 oz/sq ft (0.915 kg/sq m) copper sheet coated with elastic asphalt compound.
1. Manufacturers:
   a. Advanced Building Products, Inc; Copper Fabric Flashing: www.advancedbuildingproducts.com/sle.
   b. Hohmann & Barnard, Inc; www.h-b.com/sle.

B. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.
1. Manufacturers, Synthetic Rubber Products:

a. Mortar Net Solutions; www.mortarnet.com.

2.06 ACCESSORIES

A. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
   1. Manufacturers:
      a. Hohmann & Barnard, Inc; www.h-b.com/sle.
      b. WIRE-BOND: www.wirebond.com.

B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
      a. Manufacturers:
         1) Advanced Building Products Inc; Mortar Break DT: www.advancedbuildingproducts.com/sle.
         2) Advanced Building Products Inc; Mortar Break: www.advancedflashing.com/sle.
         3) Mortar Net Solutions; www.mortarnet.com.

C. Weeps:
   1. Type: Polyester mesh.
   2. Manufacturers:
      a. Blok-Lok Limited; www.blok-lok.com.
      b. CavClear/Archovations, Inc: www.cavclear.com.
      c. Mortar Net Solutions; www.mortarnet.com.

D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.07 MORTAR AND GROUT MIXES

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Exterior, loadbearing masonry: Type N.
   2. Exterior, non-loadbearing masonry: Type N.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.

C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

D. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
   3. Mortar Joints: Concave.

D. Brick Units:
   1. Bond: As indicated for different locations.
   2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
   3. Mortar Joints: Concave.

3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Remove excess mortar and mortar smears as work progresses.

C. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

D. Interlock intersections and external corners, except for units laid in stack bond.

E. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

F. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

G. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

3.06 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally above through-wall flashing, above shelf angles and lintels, and at bottom of walls.

3.07 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.08 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.

3.09 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER

A. Install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Masonry Back-Up: Embed anchors in masonry back-up to bond veneer at maximum 1.77 sq ft (0.16 sq m) of wall surface per anchor. Place additional anchors at perimeter of openings and ends of panels, so maximum spacing of anchors is 8 inches (200 mm) on center.

F. Seismic Reinforcement: Connect veneer anchors with continuous horizontal wire reinforcement before embedding anchors in mortar.

3.10 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY

A. Install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of openings.

C. Place continuous joint reinforcement in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum 6 inches (150 mm).

E. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches (600 mm) horizontally and 16 inches (400 mm) vertically.

3.11 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up at least 8 inches (203 mm), minimum, to form watertight pan at non-masonry construction.
   2. Remove or cover protrusions or sharp edges that could puncture flashings.
   3. Seal lapped ends and penetrations of flashing before covering with mortar.

B. Extend metal flashings to within 1/4 inch (6 mm) of exterior face of masonry.

C. Extend plastic, laminated, EPDM, and flashings to within 1/4 inch (6 mm) of exterior face of masonry.

D. Lap end joints of flashings at least 6 inches (152 mm), minimum, and seal watertight with flashing sealant/adhesive.

3.12 LINTELS

A. Install loose steel lintels over openings.

B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
   1. Openings to 42 inches (1070 mm): Place two, No. 3 (M9) reinforcing bars 1 inch (25 mm) from bottom web.
   2. Openings from 42 inches (1070 mm) to 78 inches (1980 mm): Place two, No. 5 (M16) reinforcing bars 1 inch (25 mm) from bottom web.
   3. Openings over 78 inches (1980 mm): Reinforce openings as detailed.
   4. Do not splice reinforcing bars.
   5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.
   6. Place and consolidate grout fill without displacing reinforcing.
   7. Allow masonry lintels to attain specified strength before removing temporary supports.

3.13 GROUTED COMPONENTS

A. Reinforce bond beams as indicated by drawings.

B. Reinforce columns as indicated by drawings.

C. Lap splices minimum 24 bar diameters.

D. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

E. Place and consolidate grout fill without displacing reinforcing.

F. At bearing locations, fill masonry cores with grout for a minimum 12 inches (300 mm) either side of opening.

3.14 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.15 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

3.16 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.

D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

3.17 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.18 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.

C. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

3.19 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

3.20 PROTECTION

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

3.21 SCHEDULES

A. Exterior Wall: Composite masonry with an exterior wythe of "Dark Brown" brick veneer, bonded with wire ladder reinforcement to inner wythe of interior facing split faced concrete block masonry (CMU) with 2 inch (50 mm) space for insulation.

END OF SECTION

SECTION 04 7300

MANUFACTURED STONE MASONRY

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Submittals: Samples for adhered masonry veneer units and colored mortar.

B. Submit qualification data for masonry contractor, including a list of completed projects.

C. Construct a sample wall panel approximately 48 inches long by 48 inches high to demonstrate aesthetic effects and set quality standards for materials and execution.

D. Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

E. Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 ADHERED MASONRY VENEER UNITS

A. Adhered Masonry Veneer Units: Units made from wet-cast lightweight concrete and intended to resemble natural stone.

1. Products:

   a. G.S. Harris Co., Inc. 2810 Pennsylvania Avenue, Ogden UT 84401. 888.878.6631, info@harristone.com.

2. Shapes, Colors, and Texture: **Type:** Uintah Drystack Ledgestone **Color:** Brown; or approved equivalent
3. Compressive Strength: Not less than 1,800 psi
4. Saturated Density: Not more than 15 lb/sq. ft.
5. Water Absorption: Not more than 18 lb/cu. ft.
6. Freeze-Thaw Durability: Units shall have adequate durability for the intended use as demonstrated by test or by proven field performance.

2.2 MORTAR

A. Mortar: ASTM C 270, Proportion Specification, Type S for setting stone, Type S for pointing.

1. Use manufacture's recommended mortar.
2. Low-Alkali Cement: Use portland cement with not more than 0.60 percent total alkali per ASTM C 114.
3. Colored Pointing Mortar: Use colored cement product of color selected.

B. Latex-Modified Portland Cement Setting Mortar: Proportion and mix portland cement, aggregate, and latex additive to comply with latex-additive manufacturer's written instructions.

1. Latex Additive: **Manufacturer's standard** water emulsion.

a. Manufacturers:

1) Boiardi Products; a QEP company.
2) Bostik, Inc.
3) C-Cure.
4) Laticrete International, Inc.
5) MAPEI Corporation.
6) Mer-Krete Systems; ParexLahabra, Inc.
7) ProSpec; Bonsal American; a division of Oldcastle Architectural Products Group.
8) Southern Grouts & Mortars, Inc.
9) Summitville Tiles, Inc.
10) TEC Specialty Construction Brands, Inc.; an H. B. Fuller company.

C. Latex-Modified Portland Cement Setting Mortar: 1 part portland cement, 1/2 part lime, and 5 parts sand.

D. Mortar for Scratch Coat over Unit Masonry: 1 part portland cement, 1 part lime, and 7 parts sand.

2.3 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Copper, 10-oz./sq. ft. weight or 0.0135 inch thick for fully concealed flashing,

2.4 MISCELLANEOUS MATERIALS

A. Weeps: Free-draining polyethylene mesh, full width of head joint and 2 inches high.

B. Expanded Metal Lath: ASTM C 847, 3.4-lb/sq. yd. galvanized, self-furring, diamond-mesh lath.

C. Acidic Cleaner: Cleaner designed for removing mortar stains from masonry surfaces; expressly approved for intended use by cleaner manufacturer and adhered masonry veneer unit producer.

PART 3 - EXECUTION

3.1 SETTING ADHERED MASONRY VENEER

A. Comply with adhered masonry veneer unit manufacturer's written directions.

B. Execute masonry by skilled masons experienced with the kind and form of units and installation method indicated. Arrange stones for good fit, in pattern indicated.

C. Maintain uniform joint widths except for variations due to different stone sizes and minor variations required to maintain bond alignment.

D. Install embedded flashing and weeps at shelf angles, ledges, other obstructions to downward flow of water in wall, and where indicated.

1. Extend flashing 4 inches into masonry at each end and turn up 2 inches to form a pan.

E. Install lath over weather-resistant sheathing paper by fastening through sheathing into framing to comply with ASTM C 1063.

F. Install lath over unit masonry and concrete to comply with ASTM C 1063.

G. Install 1/2-inch- thick scratch coat over metal lath. Coat backs of units and face of scratch coat with cement-paste bond coat, then butter both surfaces with setting mortar. Tap units into place, completely filling space between units and scratch coat.

H. Rake out joints for pointing 1/2 inch deep.

3.2 POINTING

A. Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

B. Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce joint profile indicated.

3.3 CLEANING

A. In-Progress Cleaning: Clean masonry as work progresses. Remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly cured, remove large mortar particles, scrub, and rinse adhered masonry veneer.

1. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.

END OF SECTION

SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-structural dimension lumber framing.

B. Roofing nailers.

C. Preservative treated wood materials.

D. Communications and electrical room mounting boards.

E. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

A. Section 06 1753 - Shop-Fabricated Wood Trusses.

B. Section 07 2500 - Weather Barriers: Air barrier over sheathing.

C. Section 07 6200 - Sheet Metal Flashing and Trim: Sill flashings.

F. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

C. AWPA U1 - Use Category System: User Specification for Treated Wood; 2017.

D. ICC-ES AC310 - Acceptance Criteria for Water-resistive Membranes Factory-bonded to Wood-based Structural Sheathing, Used as Water-Resistive Barriers; 2008, with Editorial Revision (2015).

E. PS 2 - Performance Standard for Wood-Based Structural-Use Panels; 2010.

F. PS 20 - American Softwood Lumber Standard; 2015.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

C. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.

2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

A. Sizes: Nominal sizes as indicated on drawings, S4S.

B. Moisture Content: S-dry or MC19.

C. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm)):
1. Species: Douglas Fir-Larch.
2. Grade: No. 2.

D. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm)):
1. Species: Douglas Fir-Larch.
2. Grade: No. 1 & Btr.

E. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S, No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

A. Roof Sheathing: Oriented strand board structural wood panel, PS 2, with factory laminated roofing underlayment layer.
1. Sheathing Panel:
a. Grade: Structural 1 Sheathing.
b. Size: 4 feet (1219 mm) wide by 8 feet (2438 mm) long.
c. Performance Category: 5/8 PERF CAT.
d. Span Rating: 40/20.
e. Edge Profile: Square edge.
2. Integral Roofing Underlayment Layer: Medium density, phenolic impregnated kraft paper overlay.
3. Exposure Time: Sheathing undamaged and integral roofing underlayment layer intact after exposure to weather for up to 180 days.
4. Provide fastening guide on top panel surface with separate markings indicating fastener spacing for 16 inches (406 mm) and 24 inches (610 mm) on center.
5. Seam Tape: Manufacturer's standard pressure-sensitive, self-adhering, cold-applied seam tape consisting of polyolefin film with acrylic adhesive.
6. Warranty: Manufacturer's standard 30 year limited system warranty of:
a. Performance: Panel and tape resistance to water penetration; tape adhesion.
b. Material: Free from manufacturing defects and panel delamination.

B. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

C. Other Applications:
1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
3. Other Locations: PS 1, C-D Plugged or better.

2.04 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
   2. Anchors: Toggle bolt type for anchorage to hollow masonry.

B. Sill Gasket on Top of Foundation Wall: 1/4 inch (6 mm) thick, plate width, closed cell plastic foam from continuous rolls.

C. Sill Flashing: As specified in Section 07 6200.

D. Water-Resistive Barrier: As specified in Section 07 2500.

2.05 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Preservative Treatment:
   1. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber in contact with roofing, flashing, or waterproofing.
      c. Treat lumber in contact with masonry or concrete.
      d. Treat lumber less than 18 inches (450 mm) above grade.

PART 3 EXECUTION

3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. Coordinate installation of rough carpentry members specified in other sections.

3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.03 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.04 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

C. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. At long edges use sheathing clips where joints occur between roof framing members.
   2. Nail panels to framing; staples are not permitted.

B. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size and Location: As indicated on drawings.

3.07 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.08 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

3.09 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 7419 - Construction Waste Management and Disposal.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION

SECTION 06 1323
HEAVY TIMBER FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Heavy structural timber for posts, beams, joists, purlins, and _____.

B. Connection hardware.

1.02 REFERENCE STANDARDS

A. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber; 2000.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate dimensions, wood species and grades, component profiles, drilled holes, fasteners, connectors, erection details and sequence.
   1. Include the design engineer's seal and signature on each sheet of shop drawings.

C. Product Data: Submit data on proprietary connection devices.

D. Product Data: Submit technical data on wood preservative materials, application instructions.

1.04 QUALITY ASSURANCE

A. Designer Qualifications: Design members under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

PART 2 PRODUCTS

2.01 WOOD MATERIALS

A. Wood fabricated from old growth timber is not permitted.

B. Lumber Grading Rules: RIS (GR).

C. Lumber: Stress group ____; _____ species; ____ grade; maximum moisture content of ____ percent.

2.02 ACCESSORIES

A. Connectors: Type weldable steel. Provide _____ manufactured by _____.

B. Bolts, Nuts, Washers, Lags, and Screws, Preservative-Treated Wood: Stainless steel; size and type to suit application.

2.03 WOOD TREATMENT

A. Wood Preservative (Surface Application):

PART 3 EXECUTION

3.01 ERECTION

A. Set structural members level and plumb, in correct position.

B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Do not field cut or alter structural members without approval of Architect.

3.02 SITE APPLIED WOOD TREATMENT

A. Brush apply one coats of preservative treatment on wood in contact with cementitious materials and roofing and related metal flashings.

B. Apply preservative treatment in accordance with manufacturer's instructions.

C. Treat site-sawn ends.

D. Allow preservative to cure prior to erecting members.

END OF SECTION

SECTION 06 1753
SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated wood trusses for roof framing.

B. Bridging, bracing, and anchorage.

C. Preservative treatment of wood.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.

1.03 REFERENCE STANDARDS

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

B. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction; 2014.

C. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses; 2015.

D. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses; 1989.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on plate connectors, bearing plates, and metal bracing components.

C. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing.
   1. Include identification of engineering software used for design.
   2. Provide shop drawings stamped or sealed by design engineer.

D. Designer's Qualification Statement.

E. Fabricator's Qualification Statement.

1.05 QUALITY ASSURANCE

A. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Handle and erect trusses in accordance with TPI BCSI 1.

B. Store trusses in vertical position resting on bearing ends.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Truss Plate Connectors:
   1. Alpine, an ITW Company; www.alpineitw.com
   2. MiTek Industries, Inc; www.mii.com
   3. Simpson Strong-Tie Company; www.strongtie.com

B. Truss Fabricators:

1. BMC – Building Materials & Construction Solutions; www.buildwithbmc.com
2. Sunroc Building Materials; www.sunrocbuildingmaterials.com
3. Wasatch Truss, Inc.; www.wastchtruss.com

2.02 TRUSSES

A. Wood Trusses: As defined by the STRUCTURAL GENERAL NOTES.

2.03 MATERIALS

A. Lumber: As defined by the STRUCTURAL GENERAL NOTES.

B. Steel Connectors: As defined by the STRUCTURAL GENERAL NOTES.

C. Truss Bridging: As defined by the STRUCTURAL GENERAL NOTES.

2.04 ACCESSORIES

A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: As specified in Section 06 1000.

B. Fasteners: Electrogalvanized steel, type to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that supports and openings are ready to receive trusses.

3.02 PREPARATION

A. Coordinate placement of bearing items.

3.03 ERECTION

A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1; maintain a copy of each TPI document on site until installation is complete.

B. Set members level and plumb, in correct position.

C. Install permanent bridging and bracing.

3.04 TOLERANCES

A. Framing Members: 1/2 inch (12 mm) maximum, from true position.

END OF SECTION

SECTION 07 2100
THERMAL INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Board insulation and integral vapor retarder at cavity wall construction.

B. Batt insulation.

1.02 RELATED REQUIREMENTS

A. Section 04 2723 - Cavity Wall Unit Masonry: Masonry walls enclosing insulation.

B. Section 06 1000 - Rough Carpentry: Supporting construction for batt insulation.

C. Section 07 2500 - Weather Barriers: Separate air barrier and vapor retarder materials.

1.03 REFERENCE STANDARDS

A. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2016a.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2018.

C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2017.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

E. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C; 2016a.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.

D. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.

F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

1.05 QUALITY ASSURANCE

A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); www.airbarrier.org/#sle:

1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture. Use secondary materials approved in writing by primary material manufacturer.

1.06 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 APPLICATIONS

A. Insulation Inside Masonry Cavity Walls: Extruded polystyrene (XPS) board.

B. Insulation in Wood Framed Ceiling Structure: Batt insulation with integral vapor retarder.

2.02 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. R-value (RSI-value); 2 inch (25 mm) of material at 72 degrees F (22 C): 5 (0.88), minimum.
   4. Board Edges: Square.
   5. Manufacturers:
      a. Dow Chemical Company; STYROFOAM HIGHLOAD 40: www.dowbuildingsolutions.com/#sle.
      b. Kingspan Insulation LLC; GreenGuard XPS TYPE VI 40 PSI: www.trustgreenguard.com/#sle.
      c. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/#sle.

2.03 BATT INSULATION MATERIALS

A. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.
   1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   4. Formaldehyde Content: Zero.
   5. Thermal Resistance: R-value (RSI-value) of as noted on drawings.
   6. Facing: Unfaced.
   7. Manufacturers:
      a. CertainTeed Corporation; www.certainteed.com.
      b. Johns Manville; www.jm.com.
      c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.

2.04 ACCESSORIES

A. Tape: Reinforced polyethylene film with acrylic pressure sensitive adhesive.
   1. Application: Sealing of interior circular penetrations, such as pipes or cables.
   2. Width: Are required for application.

B. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

C. Nails or Staples: Steel wire; electroplated or galvanized; type and size to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT CAVITY WALLS

A. Install boards to fit snugly between wall ties.

B. Install boards horizontally on walls.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BATT INSTALLATION

A. Install insulation and vapor retarder in accordance with manufacturer's instructions.

B. Install in exterior ceiling spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

E. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.

F. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches (150 mm) on center. Lap and seal sheet retarder joints over member face.

G. Tape seal tears or cuts in vapor retarder.

H. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

3.05 PROTECTION

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

END OF SECTION

SECTION 07 2500
WEATHER BARRIERS

PART 1 GENERAL

1.01 SECTION INCLUDES

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

1.02 RELATED REQUIREMENTS

A. Section 07 6200 - Sheet Metal Flashing and Trim: Metal flashings installed in conjunction with weather barriers.

1.03 DEFINITIONS

A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.

B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.04 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.

C. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on material characteristics.

C. Manufacturer's Installation Instructions: Indicate preparation.

1.06 FIELD CONDITIONS

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

PART 2 PRODUCTS

2.01 WEATHER BARRIER ASSEMBLIES

A. Air Barrier:
   1. On outside surface of inside wythe of exterior masonry cavity walls use air barrier coating.

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

A. Air Barrier Sheet, Mechanically Fastened:
   1. Air Permeance: 0.004 cubic feet per minute per square foot (0.02 L/s/sq m), maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 5 perms (286 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
   3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 180 days of weather exposure.
   4. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
   5. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches (50 mm) wide, compatible with sheet material; unless otherwise specified.
   6. Manufacturers:

a. DuPont Building Innovations; Tyvek Commercial Wrap with Tyvek Fluid Applied Flashing - Brush Formulation, Tyvek Fluid Applied Flashing and Joint Compound, FlexWrap NF, StraightFlash, StraightFlash VF, Tyvek Wrap Caps, and Tyvek Tape: www.dupont.com/#sle.
b. Substitutions: See Section 01 6000 - Product Requirements.

B. Air Barrier, Fluid Applied: Vapor permeable, elastomeric waterproofing.
1. Air Barrier Coating:
a. Air Permeance: 0.004 cubic feet per minute per square foot (0.02 L/s/sq m), maximum, when tested in accordance with ASTM E2178.
b. Water Vapor Permeance: 5 perms (287 ng/(Pa s sq m)), minimum, when tested in accordance with ASTM E96/E96M, Procedure B.
c. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to six months of weather exposure after application.
d. Surface Burning Characteristics: Flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
e. Sealants, Tapes and Accessories: As recommended by coating manufacturer.
f. Manufacturers:
1) Dow Chemical Company; Defend Air 200: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
2) Substitutions: See Section 01 6000 - Product Requirements.

2.03 ACCESSORIES

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

PART 3 EXECUTION

3.01 EXAMINATION

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

3.02 PREPARATION

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

B. Clean and prime substrate surfaces to receive adhesives and sealants in accordance with manufacturer's instructions.

3.03 INSTALLATION

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

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

C. Mechanically Fastened Sheets - On Exterior:
1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
2. Overlap seams as recommended by manufacturer but at least 6 inches.
3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches (305 mm).
4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
5. Install air barrier and vapor retarder UNDER jamb flashings.
6. Install head flashings under weather barrier.
7. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

D. Coatings:
1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.

2. Use flashing to seal to adjacent construction and to bridge joints.

E. Openings and Penetrations in Exterior Weather Barriers:
   1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches (125 mm) onto weather barrier and at least 6 inches (150 mm) up jambs; mechanically fasten stretched edges.
   2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches (100 mm) wide; do not seal sill flange.
   3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches (230 mm) wide, covering entire depth of framing.
   4. At head of openings, install flashing under weather barrier extending at least 2 inches (50 mm) beyond face of jambs; seal weather barrier to flashing.
   5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
   6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Coordination of ABAA Tests and Inspections:
   1. Provide testing and inspection required by ABAA QAP.
   2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
   3. Cooperate with ABAA testing agency.
   4. Allow access to air barrier work areas and staging.
   5. Do not cover air barrier work until tested, inspected, and accepted.

C. Take digital photographs of each portion of the installation prior to covering up.

3.05 PROTECTION

A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 4113
METAL ROOF PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural roofing system of preformed steel panels.

B. Attachment system.

C. Finishes.

D. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Roof sheathing.

B. Section 07 9200 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.

1.03 REFERENCE STANDARDS

A. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2017.

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2018.

C. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings; 2017.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Storage and handling requirements and recommendations.
   2. Installation methods.
   3. Specimen warranty.

C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
   1. Show work to be field-fabricated or field-assembled.

D. Selection Samples: For each roofing system specified, submit color chips representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches (305 mm) square, representing actual roofing metal, thickness, profile, color, and texture.

F. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store roofing panels on project site as recommended by manufacturer to minimize damage to panels prior to installation.

1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence

of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of five years from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Basis of Design: ATAS International, Inc.; Colonial Seam: www.atas.com.

2.02 ARCHITECTURAL METAL ROOF PANELS

A. Architectural Metal Roofing: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.

B. Metal Panels: Factory-formed panels with factory-applied finish.
   1. Steel Panels:
      a. Steel Thickness: Minimum 24 gage (0.024 inch) (0.61 mm).
   2. Texture: Smooth.
   3. Width: Maximum panel coverage of 16 inches (406 mm).

2.03 ATTACHMENT SYSTEM

A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.04 FABRICATION

A. Panels: Provide factory or field fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.

2.05 FINISHES

A. Fluoropolymer Coating System: Manufacturer's standard multi-coat thermocured coating system, including minimum 70 percent fluoropolymer color topcoat with minimum total dry film thickness of 0.9 mil (0.023 mm); color and gloss to match sample.

2.06 ACCESSORIES

A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, and equipment curbs of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.

B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.

C. Sealants:
   1. Exposed Sealant: Elastomeric; silicone, polyurethane, or silyl-terminated polyether/polyurethane.
   2. Concealed Sealant: Non-curing butyl sealant or tape sealant.

D. Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
   1. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.
   2. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
   3. Fasteners: As specified by manufacturer and building code qualification report or approval.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.

B. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.

C. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.03 INSTALLATION

A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
   1. Install roofing system with concealed clips and fasteners, except as otherwise recommended by manufacturer for specific circumstances.
   2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, trim, moldings, closure strips, preformed crickets, caps, equipment curbs, rib closures, ridge closures, and similar roof accessory items.

C. Roof Panels: Install panels in strict accordance with manufacturer92s instructions, minimizing transverse joints except at junction with penetrations.

3.04 CLEANING

A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

3.05 PROTECTION

A. Do not permit storage of materials or roof traffic on installed roof panels. Provide temporary walkways or planks as necessary to avoid damage to completed work. Protect roofing until completion of project.

B. Touch-up, repair, or replace damaged roof panels or accessories before Date of Substantial Completion.

END OF SECTION

SECTION 07 6200
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.

B. Sealants for joints within sheet metal fabrications.

C. Precast concrete splash pads.

1.02 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry: Metal flashings embedded in masonry.

B. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.

C. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007, with Editorial Revision (2012).

E. CDA A4050 - Copper in Architecture - Handbook; current edition.

F. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples 6 by 6 inch (____by____ mm) in size illustrating metal finish color.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch (0.61 mm) thick base metal, shop pre-coated with PVDF coating.
   1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.

2.02 FABRICATION

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Form pieces in longest possible lengths.

C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

F. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

2.03 GUTTER AND DOWNSPOUT FABRICATION

A. Gutters: SMACNA (ASMM), Rectangular profile.

B. Downspouts: Rectangular profile.

C. Accessories: Profiled to suit gutters and downspouts.
   1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.

D. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi (21 MPa) at 28 days, with minimum 5 percent air entrainment.

E. Downspout Boots: Steel.

F. Downspout Extenders: Same material and finish as downspouts.

G. Seal metal joints.

2.04 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Primer: Zinc chromate type.

C. Concealed Sealants: Non-curing butyl sealant.

D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

E. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.01 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Secure gutters and downspouts in place with concealed fasteners.

E. Connect downspouts to downspout boots, and seal connection watertight.

F. Set splash pads under downspouts.

3.02 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

SECTION 07 7100
ROOF SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Manufactured roof specialties, including fascias and vents.

B. Roof membrane vents.

1.02 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

C. NRCA (RM) - The NRCA Roofing Manual; 2018.

D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

C. Samples: Submit two appropriately sized samples of coping and gravel stop.

D. Manufacturer's Installation Instructions: Indicate special procedures, fasteners, supporting members, and perimeter conditions requiring special attention.

PART 2 PRODUCTS

2.01 COMPONENTS

A. Engineered Roof Ventilation:
   1. Eave Vent System: Factory fabricated, formed panels with integral attachment flanges and snap-on cover.
      a. Vent Material: 22 gage (0.0299 inch) (0.76 mm) steel.
      b. Perforated Screen: 24 gage (0.0239 inch) (0.61 mm) galvanized steel; with 54 percent open area perforation.
      c. Finish: Manufacturer's standard polyvinylidene fluoride (PVDF) coating.
      d. Finish Color: To be selected by Architect from manufacturer's standard range.
      e. Manufacturers:
         1) Atlas Roofing Corporation; Wind-Lok Soffit MPV: www.atlasroofing.com/#sle.
         2) Substitutions: See Section 01 6000 - Product Requirements.

2.02 FINISHES

A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as indicated.

2.03 ACCESSORIES

A. Sealant for Joints in Linear Components: As recommended by component manufacturer.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.

END OF SECTION

SECTION 07 9200
JOINT SEALANTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nonsag gunnable joint sealants.

B. Self-leveling pourable joint sealants.

C. Joint backings and accessories.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Additional requirements for sealants and primers.

B. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders.

C. Section 08 7100 - Door Hardware: Setting exterior door thresholds in sealant.

1.03 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2017.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

D. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2008 (Reapproved 2012).

E. ASTM C1311 - Standard Specification for Solvent Release Sealants; 2014.

F. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015e1.

G. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

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

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

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective work within a five year period after Date of Substantial Completion.

C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal , exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
   1. Bostik Inc; _____: www.bostik-us.com.

2. Dow Chemical Company; _____: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
3. Pecora Corporation; _____: www.pecora.com.
4. Sika Corporation; _____: www.usa-sika.com/#sle.
5. Tremco Commercial Sealants & Waterproofing; ____: www.tremcosealants.com/#sle.
6. W.R. Meadows, Inc; _____: www.wrmeadows.com.
7. Substitutions: See Section 01 6000 - Product Requirements.

B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.
1. Bostik Inc; _____: www.bostik-us.com.
2. Dow Chemical Company; _____: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
3. Pecora Corporation; _____: www.pecora.com.
4. Sika Corporation; _____: www.usa-sika.com/#sle.
5. Tremco Commercial Sealants & Waterproofing; ____: www.tremcosealants.com/#sle.
6. W.R. Meadows, Inc; _____: www.wrmeadows.com.
7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 JOINT SEALANT APPLICATIONS

A. Scope:
1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
a. Wall expansion and control joints.
b. Joints between door, window, and other frames and adjacent construction.
c. Joints between different exposed materials.
d. Openings below ledge angles in masonry.
e. Other joints indicated below.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
a. Joints between door, window, and other frames and adjacent construction.
b. Other joints indicated below.
3. Do not seal the following types of joints.
a. Intentional weepholes in masonry.
b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
d. Joints where installation of sealant is specified in another section.
e. Joints between suspended panel ceilings/grid and walls.

B. Exterior Joints: Use non-sag non-staining silicone sealant, unless otherwise indicated.
1. Lap Joints in Sheet Metal Fabrications: Butyl rubber, non-curing.

C. Interior Joints: Use non-sag polyurethane sealant, unless otherwise indicated.
1. Wall and Ceiling Joints in Non-Wet Areas: Acrylic emulsion latex sealant.
2. Wall and Ceiling Joints in Wet Areas: Non-sag polyurethane sealant for continuous liquid immersion.
3. Floor Joints in Wet Areas: Non-sag polyurethane "non-traffic-grade" sealant suitable for continuous liquid immersion.
4. Narrow Control Joints in Interior Concrete Slabs: Self-leveling epoxy sealant.
5. Other Floor Joints: Self-leveling polyurethane "traffic-grade" sealant.

2.03 JOINT SEALANTS - GENERAL

A. Sealants and Primers: Provide products with levels of volatile organic compound (VOC) content as indicated in Section 01 6116.

B. Colors: As indicated on drawings.

2.04 NONSAG JOINT SEALANTS

A. Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: 50 percent, minimum.
   2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
   3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.

B. Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
   1. Color: White.

C. Polyurethane Sealant: ASTM C920, Grade NS, Uses M and A; single or multi-component; not expected to withstand continuous water immersion or traffic.
   1. Movement Capability: Plus and minus 25 percent, minimum.

D. Polyurethane Sealant for Continuous Water Immersion: ASTM C920, Grade NS, Uses M and A; single or multi-component; explicitly approved by manufacturer for continuous water immersion; suitable for traffic exposure when recessed below traffic surface .
   1. Movement Capability: Plus and minus 35 percent, minimum.

E. Acrylic Emulsion Latex: Water-based; ASTM C834, single component, non-staining, non-bleeding, non-sagging; not intended for exterior use.

F. Non-Curing Butyl Sealant: Solvent-based; ASTM C1311; single component, non-sag, non-skinning, non-hardening, non-bleeding; vapor-impermeable; intended for fully concealed applications.

2.05 SELF-LEVELING SEALANTS

A. Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
   1. Movement Capability: Plus and minus 25 percent, minimum.

B. Semi-Rigid Self-Leveling Epoxy Joint Filler: Epoxy or epoxy/polyurethane copolymer; intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
   1. Composition: Multi-component, 100 percent solids by weight.
   2. Durometer Hardness: Minimum of 85 for Type A or 35 for Type D, after seven days when tested in accordance with ASTM D2240.
   3. Joint Width, Minimum: 1/8 inch (3 mm).

2.06 ACCESSORIES

A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.

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

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

D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.

E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that joints are ready to receive work.

B. Verify that backing materials are compatible with sealants.

C. Verify that backer rods are of the correct size.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Install bond breaker backing tape where backer rod cannot be used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.

E. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.

F. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

G. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.04 POST-OCCUPANCY

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

END OF SECTION

SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated hollow metal doors and frames.

B. Thermally insulated hollow metal doors with frames.

1.02 ABBREVIATIONS AND ACRONYMS

A. ANSI - American National Standards Institute.

B. ASCE - American Society of Civil Engineers.

C. HMMA - Hollow Metal Manufacturers Association.

D. NAAMM - National Association of Architectural Metal Manufacturers.

E. NFPA - National Fire Protection Association.

F. SDI - Steel Door Institute.

G. UL - Underwriters Laboratories.

1.03 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.

C. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.

D. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

F. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2016.

G. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.

H. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.

I. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

J. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.

K. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.

L. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

M. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.

N. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.

C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.

B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Hollow Metal Doors and Frames:
   1. Ceco Door, an Assa Abloy Group company; _____: www.assaabloydss.com.
   2. Curries, an Assa Abloy Group company; _____: www.assaabloydss.com.
   3. Steelcraft, an Allegion brand; ____: www.allegion.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DESIGN CRITERIA

A. Requirements for Hollow Metal Doors and Frames:
   1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
   2. Accessibility: Comply with ICC A117.1 and ADA Standards.
   3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
   4. Typical Door Face Sheets: Flush.
   5. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
   6. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvannealed) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 HOLLOW METAL DOORS

A. Exterior Doors: Thermally insulated.
   1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
      a. Level 3 - Extra Heavy-duty.
      b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
      c. Model 1 - Full Flush.
      d. Door Face Metal Thickness: 16 gage, 0.053 inch (1.3 mm), minimum.
      e. Zinc Coating: A60/ZF180 galvannealed coating; ASTM A653/A653M.
      f. Insulating Value: U-value 0.56 when tested in accordance with ASTM C1363
   2. Door Thickness: 1-3/4 inch (44.5 mm), nominal.
   3. Door Finish: Factory primed and field finished.

2.04 HOLLOW METAL FRAMES

A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.

B. Exterior Door Frames: Full profile/continuously welded type.
   1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
   2. Frame Metal Thickness: 18 gage, 0.042 inch (1.0 mm), minimum.
   3. Frame Finish: Factory primed and field finished.

2.05 FINISHES

A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

2.06 ACCESSORIES

A. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.

B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 PREPARATION

A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.03 INSTALLATION

A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.

B. Coordinate frame anchor placement with wall construction.

C. Install door hardware as specified in Section 08 7100.

3.04 TOLERANCES

A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.

B. Maximum Diagonal Distortion: 1/16 inch (1.6 mm) measured with straight edge, corner to corner.

3.05 ADJUSTING

A. Adjust for smooth and balanced door movement.

END OF SECTION

SECTION 08 3100
ACCESS DOORS AND PANELS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Ceiling access door and frame units.

1.02 REFERENCE STANDARDS

A. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2017.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Manufacturer's Installation Instructions: Indicate installation requirements.

E. Project Record Documents: Record actual locations of each access unit.

PART 2 PRODUCTS

2.01 ACCESS DOORS AND PANELS ASSEMBLIES

A. Ceiling-Mounted Units:
   1. Location: As indicated on drawings.
   2. Material: Steel, hot-dipped zinc, or zinc-aluminum-alloy coated.
   3. Size - Other Ceilings: 24 inch by 24 inch.
   4. Door/Panel: Hinged, standard duty, with tool-operated spring or cam lock and no handle.

2.02 CEILING-MOUNTED UNITS

A. Manufacturers:
   1. ACUDOR Products Inc: www.acudor.com/#sle.
   2. Cendrex, Inc: www.cendrex.com/#sle.
   3. Milcor, Inc; ____: www.milcorinc.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Ceiling-Mounted Units: Factory fabricated door and frame, fully assembled units with corner joints welded, filled and ground flush; square and without rack or warp; coordinate requirements with type of installation assembly being used for each unit.
   1. Door Style: Single thickness with rolled or turned in edges.
   2. Frames: 16 gage, 0.0598 inch (1.52 mm), minimum thickness.
   3. Heavy Duty Single Steel Sheet Door Panels: 14 gage, 0.0747 inch (1.89 mm), minimum thickness.
   4. Insulation: Non-combustible mineral wool or glass fiber.
   5. Steel Finish: Primed.
   6. Primed and Factory Finish: Polyester powder coat; color _____.
   7. Hardware:
      a. Hinges for Non-Fire-Rated Units: Concealed, constant force closure spring type.
      b. Handle: Handle operated cam latch.
      c. Latch/Lock: Cylinder lock-operated cam latch, two keys for each unit.
      d. Gasketing: Extruded neoprene, around perimeter of door panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

3.02 INSTALLATION

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

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

END OF SECTION

SECTION 08 9100
LOUVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Louvers, frames, and accessories.

1.02 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.

B. AMCA 511 - Certified Ratings Program for Air Control Devices; 2010.

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames.

D. Samples: Submit two samples 2 by 2 inches (50 by 50 mm) in size illustrating finish and color of exterior surfaces.

E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

1.04 QUALITY ASSURANCE

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

1.05 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year manufacturer's warranty against distortion, metal degradation, and connection failures of louver components.
   1. Finish: Include twenty year coverage against degradation of exterior finish.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 LOUVERS

A. Louvers: Factory fabricated and assembled, complete with frame, mullions, and accessories; AMCA Certified in accordance with AMCA 511.
   1. Wind Load Resistance: Design to resist positive and negative wind load of 25 psf (1.2 kPa) without damage or permanent deformation.
   2. Drainable Blades: Continuous rain stop at front or rear of blade aligned with vertical gutter recessed into both jambs of frame.
   3. Screens: Provide insect screens at intake louvers and bird screens at exhaust louvers.

B. Stationary Louvers: Horizontal blade, formed galvanized steel sheet construction.
   1. Blades: Sightproof with drainable edge design.
   2. Frame: Depth as indicated on drawings, channel profile; corner joints mitered and, with continuous recessed caulking channel each side.

3. Steel Thickness, Galvanized: Frame 16 gage, 0.0598 inch (1.52 mm) minimum base metal; blades 16 gage, 0.0598 inch (1.52 mm) minimum base metal.
4. Steel Finish: Superior performing organic coatings, finished after fabrication.

2.03 MATERIALS

A. Steel Sheet: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

2.04 FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system.

B. Polyvinylidene fluoride (PVDF) multi-coat thermoplastic fluoropolymer coating system, including minimum 70 percent PVDF color topcoat and minimum total dry film thickness of 0.9 mil (0.023 mm); color and gloss as indicated on drawings.

C. Color: As selected from manufacturer's standard colors.

2.05 ACCESSORIES

A. Screens: Frame of same material as louver, with reinforced corners; removable, screw attached; installed on inside face of louver frame.

B. Fasteners and Anchors: Stainless steel.

C. Flashings: Of same material as louver frame, formed to required shape, single length in one piece per location.

D. Sealant for Setting Sills and Sill Flashing: Non-curing butyl type.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.

B. Install louvers level and plumb.

C. Install flashings and align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.

D. Secure louver frames in openings with concealed fasteners.

END OF SECTION

SECTION 09 2116
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Gypsum wallboard.

B. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Building framing.

B. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.

1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.

B. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2017a.

C. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2016.

D. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.

E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

F. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.

G. GA-216 - Application and Finishing of Gypsum Panel Products; 2016.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.
   1. See PART 3 for finishing requirements.

2.02 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   1. American Gypsum Company; www.americangypsum.com.
   2. CertainTeed Corporation; www.certainteed.com.
   3. Georgia-Pacific Gypsum; www.gpgypsum.com.
   4. USG Corporation; www.usg.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for ceilings, unless otherwise indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
      a. Mold resistant board is required at all locations.
   3. Thickness:
      a. Ceilings: 1/2 inch (13 mm).
   4. Mold Resistant Paper Faced Products:

C. Ceiling Board: Special sag resistant gypsum ceiling board as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.

1. Application: Ceilings, unless otherwise indicated.
2. Thickness: 1/2 inch (13 mm).
3. Edges: Tapered.

2.03 ACCESSORIES

A. Water-Resistive Barrier: As specified in Section 07 2500.

B. Finishing Accessories: ASTM C1047, galvanized steel, rolled zinc, or rigid plastic, unless noted otherwise.
   1. Types: As detailed or required for finished appearance.

C. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
   1. Ready-mixed vinyl-based joint compound.

D. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch (0.84 mm) in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 BOARD INSTALLATION

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.

C. Exposed Gypsum Board in Interior Wet Areas: Seal joints, cut edges, and holes with water-resistant sealant.

3.03 INSTALLATION OF TRIM AND ACCESSORIES

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

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

C. Moisture Guard Trim: Install on bottom edge of gypsum board according to manufacturer's instructions and in locations indicated on drawings.

3.04 JOINT TREATMENT

A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.

B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

3.05 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION

SECTION 09 6700
FLUID-APPLIED FLOORING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fluid-applied flooring and base.

1.02 RELATED REQUIREMENTS

A. Section 07 9200 - Joint Sealants: Sealing joints between fluid-applied flooring and adjacent construction and fixtures.

1.03 REFERENCE STANDARDS

A. ICRI 310.2R - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair; 2013.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns and colors available.

C. Samples: Submit two samples, 6 by 6 inch in size illustrating color and pattern for each floor material for each color specified.

D. Manufacturer's Installation Instructions: Indicate special procedures.

E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, procedures for stain removal, repairing surface, and suggested schedule for cleaning.

1.05 QUALITY ASSURANCE

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

B. Applicator Qualifications: Company specializing in performing the work of this section.
   1. Minimum 3 years of documented experience.
   2. Approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store resin materials in a dry, secure area.

B. Store materials for three days prior to installation in area of installation to achieve temperature stability.

1.07 FIELD CONDITIONS

A. Maintain minimum temperature in storage area of 55 degrees F (13 degrees C).

B. Maintain ambient temperature required by manufacturer 72 hours prior to, during, and 24 hours after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fluid-Applied Flooring:
   1. Elite Crete Systems; www.elitecrete.com/#sle.
   2. Key Resin Company; www.keyresin.com/#sle.
   3. PPG Paints Megaseal Fluid Applied Flooring; www.ppgpaints.com/#sle and www.ppgpmc.com/home.aspx/#sle.
   4. SPARTACOTE, a division of LATICRETE International, Inc; www.laticrete.com/#sle.
   5. Sherwin-Williams Company: General Polymers Brand; www.generalpolymers.com/#sle.
   6. Sika Corporation; www.sikafloorusa.com/#sle.
   7. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FLUID-APPLIED FLOORING SYSTEMS

A. Fluid-Applied Flooring Type Epoxy base coat(s), with broadcast aggregate.
   1. Aggregate: Quartz granules.
   2. Top Coat: Polyurethane.
   3. System Thickness: 1/8 inch (3.2 mm), nominal, when dry.
   4. Texture: Smooth.
   5. Sheen: High gloss.
   6. Color: As selected by Architect.
   7. Basis of Design Product: Sherwin-Williams Company: General Polymers Brand; Ceramic Carpet #400.

2.03 ACCESSORIES

A. Base Caps: Zinc with projecting base of 1/8 inch.

B. Cant Strips: Molded of flooring resin material.

C. Subfloor Filler: Type recommended by fluid-applied flooring manufacturer.

D. Primer: Type recommended by fluid-applied flooring manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive flooring.

B. Verify that concrete sub-floor surfaces are ready for flooring installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by flooring materials manufacturer.

C. Verify that required floor-mounted utilities are in correct location.

3.02 PREPARATION

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.

B. Prepare concrete surfaces according to ICRI 310.2R.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Grind irregularities above the surface level. Prohibit traffic until filler is cured.

D. Vacuum clean substrate.

E. Apply primer to surfaces required by flooring manufacturer.

3.03 INSTALLATION - ACCESSORIES

A. Install cant strips at base of walls where flooring is to be extended up wall as base.

B. Install terminating cap strip at top of base; attach securely to wall substrate.

3.04 INSTALLATION - FLOORING

A. Apply in accordance with manufacturer's instructions.

B. Apply each coat to minimum thickness indicated.

C. Finish to smooth level surface.

D. Cove at vertical surfaces.

3.05 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

3.06 PROTECTION

A. Prohibit traffic on floor finish for 48 hours after installation.

B. Barricade area to protect flooring until fully cured.

END OF SECTION

SECTION 09 9000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Exposed surfaces of steel lintels and ledge angles.
   2. Mechanical and Electrical:
      a. In finished areas, paint shop-primed items.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically so indicated.
   6. Glass.
   7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, submit each color in each sheen available.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Paint and Coatings: 1 gallon (4 L) of each color; store where directed.
   3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

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

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Duron, Inc: www.duron.com.
   2. Benjamin Moore & Co: www.benjaminmoore.com.
   3. PPG Paints: www.ppgpaints.com.
   4. Sherwin-Williams Company: www.sherwin-williams.com.

C. Transparent Finishes:
   1. Behr Process Corporation: www.behr.com.
   2. Sherwin-Williams Company: www.sherwin-williams.com.
   3. Kelly-Moore Paint Company, Inc.: www.kellymoore.com..

D. Primer Sealers: Same manufacturer as top coats.

E. Block Fillers: Same manufacturer as top coats.

F. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.

B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
   1. Gypsum Board: Interior Latex Primer Sealer; MPI #50.
   2. Concrete Masonry: Interior/Exterior Latex Block Filler; MPI #4.
   3. Steel, Uncoated: Anti-Corrosive Alkyd Primer for Metal; MPI #79.
   4. Steel -- Shop Primer: Interior/Exterior Quick Dry Alkyd Primer for Metal; MPI #76.
   5. Galvanized Steel: Interior Water Based Galvanized Primer; MPI #134.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
      a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Colors: To be selected from manufacturer's full range of available colors.
   1. Selection to be made by Architect after award of contract.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint E-OP - All Exterior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry, and cement board.
   1. Preparation as specified by manufacturer.
   2. Two top coats and one coat primer recommended by manufacturer.

B. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Semi-gloss: Two coats of alkyd enamel; ____.

2.04 PAINT SYSTEMS - INTERIOR

A. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
   1. Medium duty applications include doors and door frames.
   2. Two top coats and one coat primer.
   3. Top Coat(s): High Performance Architectural Interior Latex; MPI #139, 140, 141.
   4. Satin: MPI gloss level 4; use this sheen at all locations.
   5. Primer(s): As recommended by manufacturer of top coats.

B. Paint I-OP-MD-WC - Medium Duty Vertical/Overhead: Including gypsum board, plaster, uncoated steel, shop primed steel, galvanized steel, and aluminum.
   1. Two top coats and one coat primer.
   2. Top Coat(s): Interior Alkyd; MPI #47, 48, 49, 51
   3. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
   4. Top Coat Product(s):
      a. Sherwin-Williams ProMar 200 Waterbased Acrylic-Alkyd. (MPI #48)
   5. Primer(s): As recommended by manufacturer of top coats.

C. Paint I-OP-HD - Heavy Duty Vertical and Overhead: Including concrete masonry.
   1. Applications: See Finish Schedule.
   2. One top coat and one coat primer; primer may be omitted if top coat manufacturer approves.
   3. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
   4. Top Coat Product(s):
      a. Kelly-Moore Paints, 98 Multi-Seal Acrylic Sealer.
   5. Primer(s): As recommended by manufacturer of top coats.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

I. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

J. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's instructions.

C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

D. Apply each coat to uniform appearance.

E. Sand metal surfaces lightly between coats to achieve required finish.

F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 PROTECTION

A. Protect finished coatings until completion of project.

B. Touch-up damaged coatings after Substantial Completion.

3.05 SCHEDULE - PAINT SYSTEMS

END OF SECTION

SECTION 09 9660
GRAFFITI-RESISTANT COATINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes Anti-Graffiti coating system over exposed, ground finish interior concrete masonry, brick masonry, and concrete columns in the corridors.

B. Field application of paints and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:

1. Exposed surfaces of steel lintels and ledge angles.
2. Mechanical and Electrical:

    a. In finished areas, paint shop-primed items.

D. Do Not Paint or Finish the Following Items:

1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
2. Items indicated to receive other finishes.
3. Items indicated to remain unfinished.
4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
5. Floors, unless specifically so indicated.
6. Glass.
7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

1.03 DEFINITIONS

1.04 REFERENCE STANDARDS

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: For each coating system specified:

1. Provide the manufacturer’s technical information, including label analysis and instructions for handling, storing, and applying each material proposed for use.
2. List each material and cross-reference the specific coating, finish system, and application. Identify each material by the manufacturer’s catalog number and general classification.

C. Samples for Initial Selection: Pigmented anti-graffiti coating samples showing full range of colors available.

D. Samples for Verification: Pigmented anti-graffiti coating samples applied to full-size masonry units representative of concrete masonry used in the finished work.

D. Maintenance Materials: Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. See Section 01 6000 - Product Requirements, for additional provisions.
2. Coatings: 5 percent, but not less than 1 gal. of each material and color applied.
3. Label each container with color in addition to the manufacturer's label.

1.06 QUALITY ASSURANCE

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

B. Field Samples: Provide full-coat finish sample on at least 100 sq. ft. of surface; simulate finished lighting conditions for reviewing in-place work.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

2.02 ANTI-GRAFFITI COATINGS

A. Anti-Graffiti Coating System: Graffiti Solution System (GSS) by American Polymer Corp. consisting of the following products:

1. Sealer: GSS Barrier.
2. Finish: GSS-10 Anti-Graffiti Coating.
   a. Color: Clear.
   b. Finish: Gloss

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

D. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce coating systems indicated

3.03 APPLICATION

A. A. Apply special coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

1. Use applicators and techniques suited for coating and substrate indicated.
2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Scheduling Coating: Apply first coat to surfaces the have been cleaned, pretreated, or otherwise prepared for coating as soon as practicable after preparation and before subsequent surface deterioration.

1. Allow sufficient drying time between successive coats

C. Application Procedures: Apply coatings by brush, roller, or spray according to the manufacturer's directions.

1. Brushes: Use brushes best suited for the material applied.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material required.
3. Spray Equipment: Use spray equipment with orifice size as recommended by the manufacturer for the material and texture required

D. Minimum Coating Thickness: Apply each material no thinner than the manufacturer's recommended spreading rate. Provide total dry film thickness of the entire system as recommended by the manufacturer.

3.04 PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

1. Provide "WET PAINT" signs to protect newly coated finishes.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.05 SCHEDULE

A. Anti-Graffiti Coating System: Provide two finish coats with total dry film thickness not less than 4 mils over two sealer coats.

1. First Coat: American Polymer Corp. GSS Barrier Coat.
2. Second Coat: American Polymer Corp. GSS Barrier Coat.
3. Third Coat: American Polymer Corp. GSS-10 Anti-Graffiti Coating.
4. Fourth Coat: American Polymer Corp. GSS-10 Anti-Graffiti Coating.

END OF SECTION

PLUMBING AND MECHANICAL INDEX

SECTION 22 0000 - PLUMBING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Piping diagrams indicate runs, and are intended to be complete. Where fixtures are not shown connected to any services required, they shall be connected properly and completely. Connect all fixtures to various services, i.e., hot water, cold water, waste, vent, etc., as required. The work shall include furnishing of all materials and labor required for the job as described, together with all minor items implied or required to finish the entire work, and generally as follows:

1. Plumbing fixtures and piping.
2. Sanitary sewer systems.

1.02 STANDARDS

A. Plumbing installation shall be made in accordance with the 2015 International Plumbing Code, State Code, and all other applicable governing codes. In event drawings violate the codes, the contractor shall base his estimate on the code requirements.

B. See schedule on plans for sizing branch water lines to fixtures.

1.03 BURYING PIPE

A. Outside water pipe placed underground shall be buried deep enough to protect against freezing. Minimum depth of bury to be 30".

B. **Freeze Protection:** All water piping systems shall be installed and sloped to drain for winterizing purposes. Provide curb stop isolation and drain valves in 36" x 24" concrete meter box for isolating and draining the potable water systems in the building. Provide compressed air Schrader Valves for blowing out the system with compressed air where indicated. Where water lines run vertically concealed in walls or above ceilings, contractor shall provide drain valves at low point of any vertical lines to adequately drain the piping.

Drinking Fountain: (***Prairie Oaks Facility Only***) The drinking fountain shall be installed to with water supply and drain lines that can be readily drained for winterizing. Provide stop and waste valve, drain tube and buried PVC valve access piping per manufacturers instructions.

1.04 DISINFECTING

A. After flushing the mains, introduce a water and chlorine solution concentrated to 300 P.P.M. to disinfect the system and oxidize piping contaminants. Retain treated water and chlorine for a period of not less than three hours or more than six hours before final flushing out of system.

1.05 VERIFICATION OF GRADE

A. The contractor shall excavate the point of actual connection of waste piping systems to the street mains, and shall verify the actual elevation and location prior to the installation of building footings or any plumbing piping.

PART 2 - PRODUCTS

2.01 CLEANOUTS

A. Approved cleanouts shall be installed in the base of each vertical drainage line, and in the horizontal line at each 90 degree change in direction. In addition, there shall be cleanouts spaced at a maximum of 50' in all horizontal lines. All cleanouts shall be extended to accessible surfaces.

2.02 WATER HAMMER

A. Provide and install stainless steel bellows type shock absorbers in the ends of all multiple fixture water lines and in piping ahead of snap-acting automatic valves.

B. Absorbers shall be sized and located in compliance with manufacturer's recommendations for the specific application. Absorbers shall be Zurn, Wade or Smith.

C. Absorbers shall not be installed in inaccessible areas. Extend piping to accessible location.

2.03 FLASHINGS

A. All pipes passing thru the roof shall be neatly flashed watertight with approved standing seam metal roof jacks. Roof jacks shall match roofing style, slope and color.

2.04 FIXTURE STOPS

A. All stops for plumbing fixtures shall be chrome plated BrassCraft or McDonald 1/4 turn loose key ball valves.

2.05 PLUMBING FIXTURES

A. The contractor shall furnish and install all fixtures shown or specified hereinafter and make all parts complete and leave the entire system in perfect working order. He shall clean and adjust all fixtures before leaving the job. Any damaged or cracked fixtures shall be replaced at the contractor's expense.

B. The fixtures shall be all new and complete as shown or described in catalog or required for the work, including accessible loose key compression stops above the floor in supplies to all fixtures, and cast brass P-traps, unless otherwise shown. Trim for all fixtures shall be chrome-plated, and all trim shall match in design. Supply faucets shall have renewable seats and barrels.

C. Fixtures shall be Acorn as specified or approved substitutes. Faucets and Flush Valves shall be Symmons, Delaney or Chicago. Other approved manufacturers include J. R. Smith, as specified, or approved substitutes of Wade, Josam or Zurn.

PLUMBING FIXTURES

WC/1	Water Closet (ADA):	Acorn 2105-W-1.6-FVBO-HS-OFLC -EGE-CN. Wall mounted, ADA, stainless steel, siphon jet water closet with K-666C 'Bemis 1955C extra heavy duty solid plastic white open front seat with stainless steel check hinge; J.R. Smith 0110Y adjustable water closet fixture support, single right or left as required, with foot support. Delany 1229-1.6 concealed rough brass flush valve, 1" wheel angle stop with back check, wall mounted push-button actuator with wall flange, vacuum breaker, and through the wall flush connection for concealed back spud.

Water Closet shall be furnished with bright white "Enviro Glaze" finish.
Mount flush valve in convenient service location inside the utility room. Refer to architectural elevation drawings for mounting height of water closet.

L/1	Lavatory (ADA):	Acorn 1953-1-DMS-03-M-H1-GT-TPT-EG-TE. Wall mounted, ADA, stainless steel, 22"x18" x 5" deep basin, single hole punch for air controlled, single temp vandal proof faucet. Furnished with J.R. Smith 0805 concealed arms lavatory support, adjustable height. Acorn ST70 lead free, ASSE 1070 tempering valve, for tempered water connection to lavatory faucet. Air operated pushbutton valve control mounted on face of lavatory backsplash, Symmons deck mounted, vandal proof chrome plated faucet with through the wall service supply. Lavatory shall be furnished with bright white "Enviro Glaze" finish. Provide chrome plated grid strainer, chrome plated brass P-trap and tailpiece Mount tempering valve and metering valve in convenient service location inside the utility room. Refer to architectural elevation drawings for mounting height of lavatory. Insulate all water supplies and p-trap with ADA piping insulation equal to Truebro.
MV/1	Mixing Valve:	Acorn ST70-38 tempering valve, lead free, ASSE 1070 compliant, brass body, rough brass finish, allen screw temperature adjustment, set at 105 Deg F. 3/8" hw and cw inlets, 3/8" tempered water outlet. Mount in utility room.
FD/1	Floor Drain:	J.R. Smith 2005 cast iron drain with nickel bronze top. Drain to have deep seal P-trap with Proset "Trap Guard".
HB/1	Hose Bibb:	J.R. Smith 5609-QT non-freeze, anti-siphon wall hydrant with chrome plated bronze casing and face. Provide with loose key, wall clamp and set screw.
HB/2	Hose Bibb:	Chicago Faucet 387-E27CP, 1/2" hose bibb with 3/4" hose thread outlet with removable tee handle, chrome-plated, with vacuum breaker.
DF/1 (***Prairie Oaks Facility Only***)	Drinking Fountain:	Elkay Model LK4420BFAUDBFRK, Bi-level pedestal mounted drinking fountain with Pet Station and Bottle Filling Station. Mechanically activated bubbler, 316 stainless steel, heavy duty vandal resistant construction, vandal resistant bubbler, chrome plated hood guard, slow draining pet fountain basin, fully sealed freeze resistant system. Provide 48"x48" x 4" thick concrete pad for secure vandal resistant mounting. Provide complete drain and waste with freeze-resistant valve ground box, drainage cleanout to grade and stop and waste valve for complete drainage of the water line during the winter. Color of drinking fountain will be selected by the owner or architect.

2.06 WATER HEATER AND EXPANSION TANK

A. WH-1. Electric water heater, point of use, 6 gallon storage cap, 3/4" inlet and outlet, T&P valve, 2000 watt heating element, high temp safety cut-out, 120 volt 1 phase power, insulated heavy steel jacket with baked enamel finish, complete with all controls for automatic operation. Furnish w/ wall bracket and shelf, 1/4 turn ball valve drain. Mount 48" above finished floor.
Manufacturer: Rheem
Model: 81vp6s
Electrical: 2000 watt, 120 volt / 1 phase
Size: 16" dia x 16" tall

Weight: 50 lbs

Water heaters shall be Rheem, A. O. Smith, Bradford White or approved equal

B. ET-1. Domestic water expansion tank, 2 gallon total volume, 0.9 gallon acceptance volume, pre-charged diaphragm, maximum working pressure 150 psi, nsf 61, 200 deg f max temp. mount on wall near water heater. configure installation to provide for full drainage and winterization.
Manufacturer: Amtrol
Model: ST-5
Sise: 8" dia x 13" tall
Weight: 5 lbs

PART 3 - EXECUTION

3.01 PRODUCT HANDLING

A. Protection:

Use all means necessary to protect plumbing materials before, during, and after installation and to protect the installed work and materials of all other trades.

B. Replacements:

In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no additional cost to the Owner.

3.02 INSTALLATION

A. Install all plumbing fixtures in accordance with manufacturer's instructions. Provide all waste, vent water and drain connections required. Mount fixtures securely to wall or floor as indicated. Install all ancilliary options furnished with the plumbing fixtures. Refer to architectural drawings for mounting heights.

B. RESTROOM FACILITIES WILL NOT BE OCCUPIED DURING THE WINTER. Install water piping to allow for complete drainage of the water lines. Slope all water and drain lines to drain or to hose bibbs. Do not conceal piping in walls. Provide Schrader valve to allow for compressed air blow down of all plumbing water lines.

C. Install all mixing valves and flush valves in Utility Room. Mount valves at convenient service height. Provide access for servicing and draining valves.

D. Install water heater and expansion tank on Utility room wall as indicated. Provide wall mounted brackets and shelving as needed to support water heater and expansion tank . Install water piping to allow for complete drainage of the water lines, water heater and expansion tank.

3.03 TESTING

A. Furnish all required personnel and equipment and make all tests required to receive the approval of the Owner and all agencies having jurisdiction.

3.04 CLEANING UP

A. Prior to acceptance of the building, thoroughly clean all exposed portions of the plumbing installation,

removing all labels, and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

END OF SECTION 22 0000

SECTION 22 0700 - INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. It is the intent of this section of the specifications that all hot (above 105° F) and cold (below 55° F) surfaces of all piping system components be insulated, unless specifically excluded herein.

B. Systems to be insulated:
   1. Culinary hot and cold water piping system
   2. Water and waste piping below lavatories and hand sinks

C. The providing of all materials, supplies, equipment, tools, transportation, and facilities and performing all labor and service necessary to provide the work outlined above and as shown on the working drawings.

PART 2 - PRODUCTS

2.01 COMPLIANCE

A. All insulation shall conform to the requirements of the building code and have a flame spread rating of less than 25 and smoke developed rating less than 50.

B. Insulation shall be as manufactured by Schuller, Owens-Corning, Knauf, Armstrong, or Certainteed.

2.02 DOMESTIC HOT AND COLD WATER PIPING

A. All piping shall be insulated with 2-piece heavy density pipe insulation having an average "K" factor of .25 BTU at 70 degrees F mean, with all-service jacket. Thickness of insulation shall be as follows:

INSULATION THICKNESS IN INCHES FOR PIPE SIZES

PIPING SYSTEM TYPES	FLUID TEMP. RANGE, F	RUN-OUTS 2"	1" & LESS	1-1/4" TO 2"	2-1/2" TO 4"	5" TO 6"	8" & LARGER
DOMESTIC HOT & COLD WATER SYSTEMS							
Low Temp	40-200	1/2	1	1	1-1/2	1-1/2	1-1/2

B. Pipe insulation shall be fastened with self-sealing adhesive strip edge. The insulation shall be covered with an all-service jacket.

C. Fittings shall be insulated with mitered segments of insulation material wired in place and finished with a 1/4" layer of insulating cement. Flanges and valves shall be insulated with removable and replaceable covers fabricated from oversized pipe insulation and finished with an all-service PVC

jacket.

D. Valves shall be insulated as specified for fittings.

2.03 WATER & WASTE PIPING EXPOSED BELOW LAVATORIES AND HAND SINK

A. Insulate all exposed surfaces at all lavatories with an approved ADA style insulation kit as required by lavatory manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

A. The contractor shall provide a complete installation which is neat in appearance and functional. Remove all excess materials and packaging from job site.

B. All insulation shall be continuous through wall and ceiling openings and through sleeves. Insulation on all cold surfaces where vapor barrier jackets are used will be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces must be adequately insulated and vapor-sealed to prevent condensation.

C. Elbows, valves, and fittings inside the building shall be insulated as specified for the piping systems and covered with high temperature P.V.C. insulation fitting covers, or alternate method approved by the Architect/Engineer.

D. Insulation inserts and shields shall be installed on all hot and cold fluid piping systems such as domestic hot and cold water piping at the hanger supports.

E. Inserts between the pipe and pipe hangers shall consist of rigid calcium silicate pipe insulation of equal thickness to the adjoining insulation and shall be provided with vapor barrier, where required. Insulation inserts shall not be less than the following lengths:

1/2" to 2-1/2" pipe size	6" long

F. Rigid metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be formed to fit the insulation and shall extend up to the centerline of the pipe and length specified for the insulation hanger inserts.

G. Vapor barrier wrap shall be sealed tight and not penetrated by the hanger or shield. Specified adhesives, mastics, and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon. Where insulation pipes pass thru sound or fire-rated walls, floors, or ceilings, the insulation sleeves shall be sound or fire-rated to match rating of surface penetrated.

3.02 INSULATION WORKMANSHIP

A. All insulation shall be applied by specialists experienced in the field, and shall be neat in appearance.

3.03 CLEAN UP

A. The piping shall be cleaned and tested prior to installation of insulation, and fittings shall be cleaned

after insulation is installed.

END OF SECTION 22 0700

SECTION 23 0100 - GENERAL PROVISIONS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. The contractor shall carefully read the General Conditions of the Contract and all information to bidders which, with the following specifications for plumbing and exhaust systems are a part of the Contract.

1.02 BASIC BID

A. Shall include all labor and materials specified in this division. The term "furnish" and/or "install" or similar implication shall mean "furnish and install complete."

1.03 SCOPE OF WORK

A. The work to be done under this section includes the furnishing of all labor, materials, equipment, controls and accessories required to complete all plumbing, drainage, and other mechanical systems as shown on plans and/or described in these specifications, or as required to provide a complete and functional facility.

B. Work shall include, but shall not be necessarily limited to, the following:

1. Insulation systems
2. Exhaust systems
3. Culinary hot and cold water systems
4. Plumbing systems

C. This contractor shall provide all miscellaneous electrical work and control wiring for special systems where the wiring requirements are provided by the equipment manufacturers and/or suppliers.

1.04 CODES AND ORDINANCES

A. The work shall be installed in accordance with the state and local plumbing codes, and any other government code or ordinance that governs the type of work covered by these specifications. Should any drawings conflict with the city, county, or state code, the code shall govern the proper installation of the work, and no extra charge shall be made for such change.

B. Should the contractor perform any work that does not comply with the requirements of the applicable building codes, state laws, local ordinances, industry standards, or utility company regulations, he shall bear all costs arising in correcting the deficiencies.

C. Where the work required by the drawings and specifications exceeds local requirements, it shall be done as shown or specified.

1.05 DRAWINGS AND SPECIFICATIONS

A. These specifications are intended to cover all labor, material, and standards of mechanical workmanship to be employed in the work shown on the drawings and called for in these

specifications or reasonably implied by terms of same. The drawings and specifications are intended to supplement one another, and any part of the work that may be mentioned in the one and not represented in the other shall be done the same as if it had been mentioned or represented in both.

1.06 INTERPRETATION OF DRAWINGS AND DOCUMENTS

A. Any interpretation or correction of the proposed documents will be made only by addenda duly issued, and a copy of such addenda will be mailed or delivered to each person receiving a set of such documents.

B. The Owner's representative will interpret the meaning of any part of the drawings and specifications about which any misunderstanding may arise, and his decisions will be final. Should there appear to be any error or discrepancy in or between the drawings and specifications, the contractor shall refer the matter to the Owner's representative for adjustment before bidding the work. Should the contractor proceed with the work without so referring the matter, he does so on his own responsibility.

1.07 WORKMANSHIP

A. Workmanship shall be the best quality of its kind for the respective industries, trades, crafts, and practices, and shall be acceptable in every respect to the Owner's representative.

1.08 SUBSTITUTIONS

A. See Special Conditions pertaining to Substitutions.

1.09 FEES AND PERMITS

A. This contractor shall obtain all necessary permits and pay all fees required in connection with the work.

B. Rules of local utility companies shall apply at time of bidding. Contractor shall have checked with each utility company supplying services to this installation, and shall determine from them all valves, boxes, meter boxes, and meters which they will require to be installed, and shall figure cost of same in his bid. No extra payment will be made for installation of such items.

1.10 SITE INSPECTION AND EXAMINATION OF DRAWINGS

A. The contractor shall carefully study all drawings and specifications pertaining to the work. If any of the work as laid out, indicated, or specified is contrary to or conflicts with any governing ordinances or regulations, the same shall be reported to the Owner's representative before submitting a bid. The Owner's representative will then issue instructions as to procedure.

B. The contractor shall carefully examine the building site and compare the drawings with existing conditions. By the act of submitting a bid, the contractor shall be deemed to have made examination, have accepted such conditions, and to have made allowance therefore in preparing his bid.

1.11 VERIFICATION OF DIMENSIONS

A. Before proceeding with any work, the contractor shall carefully check and verify all dimensions, sizes, etc., and shall assume full responsibility for the fitting-in of his ductwork, piping, and

equipment. Where apparatus and equipment has been indicated on the drawings, dimensions have been taken from typical equipment of the class indicated. The contractor shall carefully check the drawings to see that the equipment he is required to install will fit into the spaces provided, and will allow for proper maintenance and service of the equipment.

1.12 RECORD DRAWINGS

A. The contractor shall keep up to date a complete record set of prints which shall be corrected daily to show changes from the original drawings and specifications, the size and kind of equipment, location and inverts of all buried or concealed pipes and ducts, etc. Upon completion of the work, the set of record drawings shall be turned over to the Owner's Representative.

1.13 COOPERATION WITH OTHERS

A. The contractor shall so organize the work that progress will harmonize with the work of all trades, so that all work may proceed as expeditiously as possible.

1.14 LOCATION OF CEILING OUTLETS

A. This contractor shall assist the Owner's representative, General Contractor, Electrical Contractor and other interested parties in the establishment of room centerlines, axis of rooms and all walls.

B. All grilles, ceiling diffusers, etc. shall be located with reference to these established data points.

C. These outlets shall be referenced to such features as room centerlines, walls and ceiling furrings, balanced border widths, etc.

1.15 LOCATION OF PIPING AND EQUIPMENT

A. The locations of all piping, ducts, apparatus, and equipment indicated on the drawings are approximate only, and shall be changed, as necessary and as approved by the Owner's Representative, to meet the actual structural and architectural conditions at the job site. Any change in work which has not been installed shall be made by the contractor without additional compensation, except changes which are caused by architectural and structural changes which increase the size of mains, the number of fixtures or the length of runs. All changes shall be made only upon approval of a written change order.

1.16 GUARANTEE

A. By the acceptance of the contract award for the work herein described, the contractor assumes the full responsibility imposed by the guarantee as set forth herein and should protect himself through proper guarantee from equipment and specialty manufacturers and subcontractors as their interests may appear.

B. All materials and equipment provided and installed under this division of the specifications shall be guaranteed for a period of one (1) year from the date of substantial completion and acceptance by the Owner.

1.17 SHOP DRAWINGS & SAMPLES

A. After checking and verifying all field measurements and after complying with applicable procedures specified in the General Requirements, the contractor shall submit to the owner's representative for review in accordance with the accepted schedule of Shop Drawing submissions, or for other appropriate action if so indicated in the Supplementary Conditions, five copies (unless otherwise specified in the General Conditions) of all Shop Drawings, which will bear a stamp or specific written indication the contractor has satisfied the contractor's responsibilities under the Contract Documents with respect to the review of the submission.

B. Before submission of each Shop Drawing or sample the contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each shop drawing or sample with other Shop Drawings and samples and with the requirements of the work and the Contract Documents.

C. At the time of each submission, the contractor shall give the Owner's representative specific written notice of each variation that the Shop Drawings or samples may have from the requirements of the Contract Documents, and, in addition, shall cause a specific notation to be made on each Shop Drawing submitted to the Owner's representative for review and approval of each such variation.

D. The Owner's representative shall review Shop Drawings for conformance with the design concept of the project and for compliance with the information given in the Contract Documents. The review shall not extend to means, methods, techniques, sequences or procedures of construction or to safety precautions or programs incident thereto. The contractor shall make corrections required by the Owner's representative, and shall return the required number of corrected copies of Shop Drawings and submit as required new samples for review and approval. The contractor shall direct specific attention in writing to revisions other than the corrections called for by the Owner's representative on previous submittals.

F. The Owner's representative's review of Shop Drawings or samples shall not relieve the contractor from responsibility for any variation from the requirements of the Contract Documents unless the contractor has in writing called the Owner's representative's attention to each such variation at the time of submission and the Owner's representative has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the Shop Drawing or sample approval; nor will any approval by the Owner's representative relieve the contractor from responsibility for errors or omissions in the Shop Drawings or from responsibility for having complied with the provisions of these specifications.

H. Shop drawings shall be neatly bound in hard-backed looseleaf binders, completely indexed.

I. Owner's Refusal Right:

In the event that items submitted are substitutions for specified items and are found to be not acceptable, the right shall be reserved to require the specified items.

1.18 OPERATING INSTRUCTIONS AND CATALOG INFORMATION

A. This contractor shall compile in three loose-leaf binders catalogs of every product used in the completion of the work.

PART 2 - PRODUCTS

2.01 MATERIALS, EQUIPMENT AND ACCESSORIES

A. Unless otherwise specified, all equipment, accessories, and materials shall be new and undamaged, and the workmanship shall be of the best quality for the use intended, and shall be acceptable to the Owner's Representative.

B. Equipment, accessories, and materials shall be essentially the standard products of the manufacturer, or as specified herein.

C. All equipment shall be selected to deliver full rated capacity at the job site elevation.

PART 3 - EXECUTION

3.01 FUNCTIONING AND OPERATION OF EQUIPMENT

A. Contractor's Responsibility:

Installation and startup shall be so made that equipment will function together as a workable system, and shall be left with all equipment properly adjusted and in working order. The contractor shall explain to the Owner the operation of the mechanical systems and fully instruct him regarding its proper operation, servicing, and maintenance.

3.02 CLEANING AND PATCHING BY MECHANICAL CONTRACTOR

A. The contractor shall remove all stains or grease marks on walls, floors, glass, hardware, fixtures, or elsewhere caused by his workmen, or for which he is responsible.

3.03 OPENINGS FOR MECHANICAL SYSTEMS

A. All openings required for installation of mechanical systems shall be provided by the mechanical contractor.

3.04 SAFETY REGULATION

A. The contractor shall comply with all local and OSHA safety requirements in performance with this work.

END OF SECTION 23 0100

SECTION 23 0593 - TESTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work outlined in this section shall be performed by the several trades involved.

B. The mechanical contractor shall provide all supervision, labor, materials, tools, scaffolding, and equipment required to complete all system testing.

C. The mechanical contractor shall remove and repair any defective component, as indicated by the system tests and retest.

D. The contractor shall test the operation of all safety and high limit controls to insure proper installation and operation. Any defective devices shall be replaced.

1.02 TESTS AND ADJUSTMENTS

A. Before any piping is covered, tests shall be made in the presence of the Owner's representative and any leaks or defective work corrected.

B. Before application of insulation covering, and as far as practical before concealing any piping, all piping shall be hydrostatically tested and proved tight. Stubs shall be capped and all control valves shall be removed during the test. System may be tested in sections, providing connections to last section tested are included in each succeeding test. Following minimum pressures shall be used for testing:

1. Low pressure air ducts in accordance with SMACNA standards.
2. Domestic hot and cold water piping at 150 psig for six hours.
3. Plumbing waste and vent piping at 10 ft. head for six hours.

C. All valves and equipment which may be damaged shall not be subjected to the test pressure.

PART 2 - PRODUCTS

2.01 EQUIPMENT

A. The contractor shall furnish all necessary gauges, plugs, etc., as required, to conduct the tests.

2.02 REPORTS

A. The contractor shall give the Owner's representative one week notice prior to performing the tests. All tests shall be recorded and copies of reports bound in the O & M manuals and given to the Owner.

PART 3 - EXECUTION

3.01 PROCEDURE

A. The contractor shall be responsible to conduct all tests in a safe manner, protecting the work of other trades from water or physical damage.

B. The tests, as indicated, shall be in addition to any test, as required, by any governing agencies. Submit all approved test procedures and results, as required by governing agencies to the Owner's Representative.

C. All tests, necessary repairs, and retest, shall be performed by the contractor which installed the system.

D. Upon completion of the work, the contractor shall demonstrate that all hot and cold water piping systems are completely drainable. Contractor shall demonstrate that all traps are properly vented, that there is an ample supply of hot and cold water to fixtures, that no fixture or equipment can be back-siphoned, and that there are no backflow connections.

END OF SECTION 23 0593

SECTION 23 0900 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section specifies the basic materials and methods to be used in Division 22 and 23.

1.02 CUTTING AND PATCHING

A. Any cutting, patching, or filling necessary for the proper execution of this work, except as noted on drawings, shall be done by this contractor.

1.03 INSERTS

A. Furnish and set, in all necessary locations, before or during construction, unistrut inserts for use in connection with the support or placing of piping, ductwork, and equipment furnished under this division of the work.

1.04 SLEEVES AND BOXES

A. Sleeves for Concrete or Masonry Surfaces:

For pipes passing thru masonry or concrete construction, provide sleeves at least two pipe sizes larger than the pipe passing thru and made from sections of steel pipe.

1.05 PIPE LOCATION AND ARRANGEMENT

A. No water supply piping inside the building shall be placed in contact with the earth. Buried water piping shall be placed in Schedule 40 PVC pipe to avoid direct pipe contact with ground. Unless otherwise noted on the drawings, all water piping shall be kept out of concrete floor slabs and shall be run overhead.

B. All piping shall be racked and supported to run straight and true. All water piping shall be sloped to drain so that the building may be completely winterized.

C. Piping shall be racked and run to facilitate maintenance work.

D. Under no circumstances shall valves, shock absorbers, drip traps, or piping specialties be installed in a "closed space" without proper access provided for future service and maintenance.

E. Pipes shall not be bent to change direction. Approved fittings must be used.

F. All valves, piping, and equipment to be installed so as to permit disassembly for maintenance purposes. Provide drain valves at all low points in piping systems. Run to floor drain, where possible, otherwise provide 3/4" hose connection with vacuum breaker.

1.06 PIPE GRADING AND SLOPE

A. Piping shall be uniformly graded in direction of flow as follows:

PIPING	FALL/RISE	DIRECTION	PER/RUN
Water	1"	Up	40'
Waste - 4" & smaller	1"	Down	4'

PART 2 - PRODUCTS

2.01 PIPING SYSTEMS

A. No foreign made piping will be accepted in this construction.

B. All piping shall be in accordance with the American Society for Testing and Materials, ASTM A-53.

C. Culinary cold and hot water above grade shall be Type "L" copper with soldered wrought copper fittings.

D. Water service and outside water lines shall be Type "K" soft drawn copper with malleable copper fittings.

E. Water piping below finished floor shall be type “K” soft drawn copper with malleable copper fittings.

F. Waste and vent piping above and below slabs shall be standard weight DWV schedule 40 solid core PVC with solvent welded joints.

G. Exposed piping, fittings, valves, and trim at plumbing fixtures shall be chrome-plated.

H.. Cleanout covers in finished walls shall be chrome finish. Floor covers shall be polished bronze or other, as specified.

2.02 HANGERS AND SUPPORTS

A. <u>Vertical Piping:</u>

1. Attachment - Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and to carry the weight of the pipe and contents. Stacks shall be supported at their bases.

2. PVC soil pipe shall be supported at its base.

3. Screwed pipe (IPS) shall be supported at not less than every other story height.

4. Copper tubing shall be supported at each story for piping one and one-half (1-1/2) inches in diameter and at not more than six (6) foot intervals for piping one and one-quarter (1-1/4) inches in diameter and smaller.

B. Horizontal Piping:

1. Supports - Horizontal piping shall be supported at sufficiently close intervals to keep it in alignment and prevent sagging.

2. PVC Soil Pipe - Where joints occur, soil pipe shall be supported at not more than 4-foot intervals. Supports shall be placed within eighteen (18) inches of the hub or joint.

3. Screwed pipe (IPS) shall be supported at approximately 12-foot intervals.

4. Copper tubing shall be supported at approximately 6-foot intervals for piping one and one-half inches and smaller in diameter and at 10-foot intervals for piping two inches and larger in diameter.

5. Piping placed underground shall be laid on a firm bed for its entire length.

6. Hangers shall be Grinnell Figure 260 for both bare and insulated pipe.

7. Where piping is run adjacent to walls or steel columns, it shall be supported from steel brackets or vertical channel hangers. Brackets shall be Grinnell Figure PS 732 or PS 3282 as directed, or approved substitute. Channel systems shall be approved for each condition on an individual basis.

8. Furnish all hangers, inserts, brackets, anchors, guides, sliding supports, etc., and all auxiliary steel necessary for the installation. All supports shall be designed in accordance with the AISC Steel Handbook.

9. Pipe covering protection saddles shall be installed at all pipe hangers which support insulated "hot surface" piping.

10. All suspended copper piping shall be securely supported from the building structure at intervals specified and/or as recommended by the pipe manufacturer. Hanger shields shall be functionally similar to isolators with Grinnell Fig. 97 hangers.

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2.03 VALVES AND STRAINERS

A. All valves and strainers shall be by one manufacturer. Approved valve manufacturers are Crane, Stockham, Jenkins, Walworth, W. C. Norris, or Powell. Crane numbers are used for convenience.

B. Domestic Hot and Cold Water:

1. Gate Valves - Valves 2" and smaller shall be Crane No. 428, bronze, screwed, 200# WOG gate valve with solid wedge disc and rising stem.

2. Globe Valves - Valves 1-1/2" and smaller shall be Crane No. 7TF, bronze, screwed, 200# WOG globe valve with a replaceable teflon disc and teflon packing. The disc shall be suitable for hot water up to 360 degrees F at 150 psi.

3. Check Valves - Valves 1-1/2" and smaller shall be Crane No. 37, bronze, screwed, Y-pattern 200# WOG swing check valve. Valves 2" and larger shall be Crane No. 373.

4. Ball Valves - For hot and cold domestic water service: Valves 2" and smaller shall be Crane No. 2190H, bronze, screwed, 200# WOG, Gem ball valve with Buna-N rubber capsule. Watts B6000 or Apollo 70-100.

5. Strainers - Strainers 1-1/2" and smaller shall be Crane No. 988-1/2, iron body, screwed Y-pattern, 200# WOG, sediment separators with a 20-mesh Monel screen.

6. All strainers shall be installed with fine mesh supplementary 'construction screens' which shall remain in place while the system is flushed and chemically cleaned. The 'construction strainer' basket shall be removed just prior to balancing the water systems.

7. Provide blow-down ball valve on all strainers same size as strainer tapping.

2.04 UNIONS

A. Ground joint unions shall be installed on pipe 2-1/2" and under where indicated on drawings. Whenever piping is connected to a major piece of apparatus, unions shall be provided as near as practical on each side of the apparatus.

2.05 ISOLATION FITTINGS

A. Approved isolation fittings shall be installed at the junction of all copper and steel piping to prevent electrolytic action.

2.06 MECHANICAL EQUIPMENT TAGGING

A. All mechanical and plumbing equipment, including fans, water heaters, and other devices shall be identified with signs made of laminated plastic 1/8" or larger engraved letters. Signs shall be securely attached by rustproof screws or some other permanent means (no adhesives).

PART 3 - EXECUTION

3.01 TESTING

A. All piping shall be tested in accordance with Section 230593 prior to applying insulation or concealing in partitions, wall, etc.

3.02 INSTALLATION OF UNDERGROUND PIPING

A. Coordinate the routing and location of all underground piping with building footings. See structural drawings.

B. Outside pipe placed underground shall be buried deep enough to protect against freezing.

C. Depth of bury of services shall be:

	Minimum
Sewer	30"
Water	30"

3.03 EXCAVATION

A. Excavation of every description and of whatever substances encountered shall be performed to the lines and grades indicated.

B. Trench Excavation: The trench shall be excavated as recommended by the manufacturer of the pipe to be installed. Trench walls below and above the top of the pipe shall be sloped, or made vertical, as recommended in the manufacturer's installation manual. The trench width below the top of the pipe shall not exceed that recommended in the installation manual. Where no manufacturer's installation manuals are available, trench walls below the top of the pipe shall be vertical, and trench walls above the top of the pipe shall be sloped as required to properly complete the work. Trench width below the top of the pipe shall not exceed 24 inches plus pipe outside diameter (O.D.). Where recommended trench widths are exceeded, redesign shall be performed by the Contractor using stronger pipe or special installation procedures. The cost of this redesign and the increased cost of the pipe or installation procedures shall be borne by the Contractor without additional cost to the Owner.

3.04 BACKFILLING

A. Backfill material shall consist of satisfactory material. Backfill shall be placed in layers not exceeding 4 inches loose thickness for compaction by hand operated machine compactors, and 8 inches loose thickness for other than hand operated machines, unless otherwise specified. Each layer shall be compacted to at least 95 percent maximum density.

3.05 ACCESS

A. All valves and equipment shall be located to allow easy access for inspection, test and balance, and operation. If valves are installed in inaccessible locations it shall be this contractor's responsibility to furnish and install access doors of a type approved by the owner's representative.

B. Locate piping, valves, etc., to allow easy access to and maintenance of equipment. Do not block walkways or tube-pull space in equipment rooms.

3.06 LOCATIONS & ARRANGEMENTS

A. All pressure gages and thermometers shall be so installed so to be easily removable from an eye level 5'-6" above the floor.

3.07 GREASING AND OILING

A. Prior to placing the equipment in operation, the bearings on all motors, fans, pumps, etc., shall be properly lubricated with a lubricant suitable for the service.

3.08 PIPE JOINING

A. All steel pipe under 2" in size shall be joined by screwed connections.

3.9 SCREWED CONNECTIONS

A. All pipe shall be reamed at the ends and free of all inside scale or burrs. Threads shall be cut clean and sharp, and to a length equal to 1-1/8 the length of the female thread receiving the pipe. The pipe shall be screwed in the full length of the female thread.

B. Pipe shall be made tight with teflon thread tape or thread lubricant worked into male thread only. Surplus material shall be wiped off and the joint left neat and clean. Lubricant shall be powdered graphite and linseed oil, and plumbage and linseed oil.

3.10 SWEAT CONNECTIONS

A. Copper piping in domestic water service: Piping shall be cut (with a pipe cutter) so ends are square and will "bottom" in fittings. There must be no gaps left thru which solder can run into the line. If a hack saw must be used, it shall be guided with a miter box to insure a square, even cut. Tubing shall be reamed to remove burrs, being careful not to expand tubing while reaming.

B. The outside of the copper pipe and the inside of the fittings, where solder will be applied, shall be burnished.

C. A light coat of soldering flux shall be applied to both pipe and fittings. Acid flux shall not be used.

D. Joints shall be uniformly heated to proper soldering temperature to insure that solder will flow to all parts of the joint. The solder shall be fed to the joint until a uniform line of solder appears around the pipe at the end of the fittings.

E. Piping shall be joined with 'Stay-Safe-50' or 'Silvabrite-100' no lead solder.

F. When valves are being installed, the non-metallic parts shall be removed to prevent the heat of soldering from damaging the valves. No heat shall be applied near where an excessive temperature may cause damage.

3.11 WASTE AND VENT PIPING INSTALLATION

A. Measure and cut PVC pipe to desired length.

B. Debur and chamfer the end of the pipe removing any ridges or rough edges. If the end is not chamfered, the edge of the pipe may remove the cement from the fitting socket and result in a leaking joint.

C. Clean and dry the surfaces to be joined.

D. Test fit the joint and mark the depth of the fitting on the outside of the pipe.

E. Uniformly apply a liberal coat of primer to inside socket surface of the fitting and the male end of the pipe to the depth of the fitting socket.

F. Promptly apply solvent cement to end of pipe and inside socket surface of fitting. Cement shall be

applied lightly, but uniformly to inside of socket, take care to keep excess cement out of socket. Apply a second coat to the end of the pipe.

G. Immediately after applying the last coat of cement to the pipe, and while both inside socket surface and the end of the pipe are wet with cement, forcefully insert the end of the pipe into the socket until it bottoms out. Turn the pipe 1/4 turn during assembly (but not after the pipe is fully inserted) to distribute the cement evenly.

H. Assembly should be completed within 20 seconds after the last application of cement. Hammer blows should not be used when inserting pipe.

I. After assembly, wipe excess cement from the pipe at the end of the fitting socket. A properly made joint will show a bead around its entire perimeter. Any gaps may indicate a defective assembly due to insufficient solvent.

J. Handle joints carefully until completely set.

K. Suspend piping a minimum of every four feet using location hangers.

END OF SECTION 23 0900

SECTION 23 3000 - AIR DISTRIBUTION AND EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

A. Work shall include exhaust, and ventilation duct systems and all materials, equipment, and labor required to complete the systems shown on plans and specified herein.

PART 2 - PRODUCTS

2.01 GENERAL

A. Construct all ducts, plenums, etc., of the gauges specified in the latest editions of the applicable SMACNA Manuals, unless otherwise shown. Sheets shall be free from blisters, slivers, pits, and imperfectly galvanized spots. All seams shall be hammered and made airtight with duct sealant.

B. Duct construction details shall comply with the latest edition of the SMACNA "Low Velocity" sheet metal and duct manuals.

2.02 DUCTWORK

A. Curved elbows shall have centerline radius equal to 1-1/2 times the width of duct. Turning vanes shall be provided at all 45 deg and 90 deg elbows as well as split tee fittings. Vanes shall be single thickness type. Air turns shall be installed in abrupt elbows and shall consist of curved metal blades or vanes with extended trailing edges arranged so as to permit air to make abrupt turn without appreciable turbulence. Air turns shall be quiet and free from vibration when system is in operation.

B. Sheet metal ducts shall be properly braced and reinforced with galvanized steel angles or other structural members, and where they protrude above roof, they shall be properly flashed. Internal ends of all slip joints shall be installed in direction of flow. Snap lock seams will be permitted on duct gages 22 ga. and lighter.

C. Dimensions:

Ducts, unless otherwise approved, shall conform accurately to the dimensions indicated on the drawings, and shall be straight and smooth on the inside with joints neatly finished. All duct sizes are free area inside dimensions.

D. Field Verifications:

No ductwork shall be fabricated without first field verifying that the available space under actual job conditions will permit installation of the ductwork without structural or other conflicts.

2.03 HIGH EFFICIENCY FITTINGS

A. Install high efficiency branch take-off fittings with hand operated volume dampers at locations and of sizes shown. Volume dampers shall be controlled by heavy duty locking quadrants mounted on

the outside of the duct.

2.05 GRILLES

A. Furnish and install complete grilles of the size and type shown on the drawings. All grilles shall be powder coated steel or aluminum construction, unless specified differently on plans or in equipment schedule. All grilles shall have "bright-white" finish, unless otherwise specified.

B. Grilles shall be Titus, Price, Krueger or Tuttle & Bailey.

C. Coordinate all grilles with ceiling system.

2.06 EXHAUST FANS

A. In Line Type:

1. Furnish and install complete the in-line exhaust fan shown and specified on the drawings.

2. Fan shall have acoustically insulated housing for quiet operation. Air deliveries shall be as indicated on the drawings and shall be certified by AMCA performance tests. Fans shall have centrifugal wheel directly connected to motor. Entire fan, motor, and wheel assembly shall be removable without disturbing the housing. Fan speeds shall not exceed 1600 RPM. Units shall be complete with chatter proof gravity back-draft dampers, disconnect switch, time delay relay and ceiling mounted motion sensor control.

3. Exhaust fan shall start upon detection of motion in the space by the ceiling mounted motion sensor and shall run continuously as long as motion is detected in the space. Fan shall continue to run after no motion is detected for 15 minutes (adjustable) whereupon the fan shall shut-off.

B. Fans shall be Penn, Twin City, Cook, Greenheck, Jenn-Air or approved substitute.

2.07 ELECTRIC UNIT HEATER [EH-1] (Herriman City Cemetery Facility Only)

A. Horizontal Type:

1. Furnish and install complete the horizontal electric unit heater shown and specified on the drawings.

2. Unit shall be UL listed for operation construction and performance. Units shall be rated for NEC Temperature T3B compliance. The unit shall be complete with all contactors and control circuits and shall be provided with a single source power connection.

3. Unit shall have horizontal air delivery of the size, capacity and voltage as listed in the equipment schedule. Unit casing shall be powder coated galvanized steel construction with threaded rod suspension support connections. The unit shall be completely accessible for service to fan motor, wiring and controls. Provide horizontal air deflectors.

4. The unit heater's heating elements shall be nickel-chromium resistance wire and magnesium oxide sheath combined with spiral-finned tubes. Elements shall have kilowatt

rating listed in the equipment schedule.

5. The unit fan shall be TEFC, continuous duty type with automatic reset, thermal overload protection, direct drive and statically balanced. The fan motor shall start and the heating elements energize whenever the wall mounted thermostat furnished with the unit heater detects a temperature less than 50 deg F (Adjustable). The fan shall run continuously to provide heat for the space served. When thermostat set point is satisfied the fan shall stop and the heating elements shall be de-energized. Operation of the electric unit heater is subject to all safeties and thermal overload protection furnished with the unit heater..

B. Electric Unit Heater shall be Modine, Trane, or Reznor, or approved substitute.

2.08 RADIANT CEILING PANEL [RP-1] (Herriman City Cemetery Facility Only)

A. Flush Ceiling Mount Type:

1. Furnish and install complete the electric radiant ceiling panels shown and specified on the drawings.

2. Panels shall be UL listed for operation construction and performance. Units shall be pre-wired and rated for the voltage indicated. The panels shall be complete with all contactors and control circuits and shall be provided with a single source power connection.

3. Panels shall be composed of sandwiched powdered graphite encapsulated in plastic laminate with heavy duty copper buss bars and high temperature fiberglass insulation. Heat transfer from the entire panel shall be uniform.

4. The panel finish shall be white. The frame casing shall be 22 galvanized gauge steel. Provide ceiling mounted plaster frame sized to accommodate the ceiling panel for gyp board ceiling mounting.

5. The radiant ceiling panel shall be controlled by a wall mounted thermostat. Set point shall be 50 deg F (adjustable). The radiant ceiling panel shall energize whenever the space temperature is below 50 deg F and shall de-energize whenever the space temperature is satisfied. Provide the controlling thermostat with lockable vandal proof stainless steel protective cover for mounting the thermostat on the wall. Mount thermostat 54 inches above the finished floor.

B. Radiant Ceiling Panel shall be QMark or approved substitute.

2.09 DAMPERS - GENERAL

A. Damper frames shall be of not less than 13 gauge galvanized steel, formed for extra strength, with mounting holes for enclosed duct mounting.

B. All damper blades shall be of not less than 16 gauge galvanized steel formed for strength and high velocity performance. Blades on all dampers must be of not over 6" in width. Blades shall be secured to 1/2" diameter zinc-plated axles by zinc-plated bolts and nuts. All blade bearings shall be nylon. Blade side edges shall seal off against spring stainless steel seals. Teflon-coated thrust bearings shall be provided at each end of every blade to minimize torque requirements and insure smooth operation.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS:

A. Inspection:

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that the work of this section may be installed in accordance with all pertinent codes and regulations in the approved shop drawings.

B. Discrepancies:

1. In the event of discrepancies, immediately notify the Owner.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3. Should the contractor proceed with the work without so resolving the discrepancy, he does so on his own responsibility.

3.02 INSTALLATION OF EQUIPMENT

A. General:

1. Install all equipment where indicated on the drawings, allowing adequate space for service to all equipment items.

2. Avoid interference with structure an the work of other trades. Do not cut into load carrying members without the approval of the Owner.

3.03 INSTALLATION OF DUCTS

A. General:

1. Install all equipment where indicated on the drawings, allowing adequate space for service to all equipment items.

2. Avoid interference with structure and the work of other trades. Do not cut into load carrying members without the approval of the Owner.

3. All necessary allowance and provisions shall be made in the installation of sheet metal ducts for the structural conditions of the building, and ducts shall be transformed or divided, as may be required. Whenever this is necessary, the required area shall be maintained. All changes, however, must be approved and installed as directed.

4. During the installation, the open ends of all ducts shall be protected by covering with plastic

sheet tied in place to prevent debris and dirt from entering.

5. Install this work in cooperation with other trades so that there will be no delay in progress of construction work. It is extremely important that the duct system be clean before final connections are made.

B. Hanger and Supports:

1. Hangers for ducts up to 18" in width shall be placed on not more than 8'-0" centers. Hangers shall be placed plumb and present a neat appearance. Construct hangers from galvanized band iron 1" x 1/8" for duct up to 36" wide. Hangers shall extend down the sides of the ducts not less than 9". On ducts less than 9" in depth, hangers shall extend the full depth of the ducts. Attach hangers to ducts using not less than three rivets or Parker screws of appropriate sizes. It is essential that all ducts be rigidly supported.

C. Ducts at Masonry:

1. Where ducts are shown connecting to masonry openings and along edges of all plenums at floors and walls, provide a continuous 2" x 2" x 3/8" galvanized angle iron which shall be bolted to the construction and made airtight to the same by applying fire-rated insulation and caulking compound.

2. Sheet metal at these locations shall be bolted to the angle irons.

3. The annular space around the ducts shall be packed with fire safing insulation and caulked or sealed, as required, to maintain the fire-rated integrity of the wall.

3.04 INSTALLATION OF EQUIPMENT

A. General:

1. Install all equipment where indicated on the drawings, allowing adequate space for service to all equipment items. Install electric unit heaters and radiant ceiling panels where applicable in accordance with manufacturers written instructions. Coordinate installation with the electrical contractor. Electrical contractor is responsible for providing all line voltage control wiring and power wiring to the equipment including all conduit and conductors. The mechanical contractor is responsible for all low voltage control wiring of thermostats and providing the thermostats where indicated.

2. All power and control wiring shall be installed in EMT conduit.

3.05 CLEANING OF DUCTS

A. Before the ceiling is installed and final connections are made to the outlets, it will be required that all fans be operated at full capacity to blow out dirt and debris from ducts.

END OF SECTION 23 3000

SECTION 26 0500

ELECTRICAL GENERAL PROVISIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Architectural, Structural, Mechanical and other applicable documents are considered a part of the electrical documents insofar as they apply as if referred to in full. Contractor must review the entire set of plans and specifications. Reviewing only the electrical set is not acceptable.

1.2 DESCRIPTION OF WORK:

A. The extent of electrical work is indicated on drawings and/or specified in Divisions 26, 27 and 28 sections of the specification. Provide all labor, materials, equipment, supervision and service necessary for a complete electrical system. Work includes, but is not necessarily limited to, the following items.

	ITEM	SECTION
1.	Electrical General Provisions	26 0500
2.	Electrical Submittals and Spare Parts	26 0502
3.	Electrical Connections for Equipment	26 0507
4.	Conductors and Cables	26 0519
5.	Grounding	26 0526
6.	Supporting Devices	26 0529
7.	Conduit Raceway	26 0532
8.	Electrical Boxes and Fittings	26 0533
9.	Electrical Seismic Control	26 0548
10.	Electrical Identification	26 0553
11.	Occupancy Sensors	26 0923
12.	Panelboards	26 2416
13.	Service Entrance	26 2713
14.	Wiring Devices	26 2726
15.	Overcurrent Protective Devices	26 2815
16.	Motor and Circuit Disconnects	26 2816
17.	Motor Starters	26 2913
18.	Interior and Exterior Building Lighting	26 5100

B. Use of standard industry symbols together with the special symbols, notes, and instructions indicated on the drawings describe the work, materials, apparatus and systems required as a portion of this work.

C. Visit the site during the bidding period to determine existing conditions affecting electrical and other work. All costs arising from site conditions and/or preparation shall be included in the base bid. No additional charges will be allowed due to inadequate site inspection.

1.3 DEFINITION OF TERMS

A. The following terms used in Divisions 26, 27 and 28 documents are defined as follows:

1. "Provide": Means furnish, install and connect, unless otherwise indicated.
2. "Furnish": Means purchase and deliver to project site.
3. "Install": Means to physically install the items in-place.
4. "Connect": Means make final electrical connections for a complete operating piece of equipment.

1.4 RELATED SECTIONS:

A. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

B. General and Supplementary Conditions: Drawings and general provisions of contract and Division 1 of the Specifications, apply to all Division 26, 27 and 28 sections.

C. Earthwork:

1. Provide trenching, backfilling, boring and soil compaction as required for the installation of underground conduit, buried cable, in-grade pull boxes, manholes, lighting pole foundations, etc. See Division 31, Sitework, and other portions of Divisions 26, 27 and 28, for material and installation requirements.

D. Miscellaneous Metal Work:

1. Provide fittings, brackets, backing, supports, rods, welding and pipe as required for support and bracing of raceways, lighting fixtures, panelboards, distribution boards, switchboards, motor controls centers, etc. See Division 5, Metals for material and installation requirements.

E. Miscellaneous Lumber and Framing Work:

1. Provide wood grounds, nailers, blocking, fasteners, and anchorage for support of electrical materials and equipment. See Division 6, Rough Carpentry for material and installation requirements.

F. Moisture Protection:

1. Provide membrane clamps, sheet metal flashing, counter flashing, caulking and sealants as required for waterproofing of conduit penetrations and sealing penetrations in or through fire walls, floors and ceiling slabs and foundation walls. All penetrations through vapor barriers at slabs on grade shall be taped and made vapor tight. See Division 7, Thermal and Moisture Protection for material and installation requirements.

G. Access panels and doors:

1. Provide in walls, ceiling, and floors for access to electrical devices and equipment. See Division 8, Doors and Windows for material and installation requirements.

H. Painting:

1. Provide surface preparation, priming and finish coating as required for electrical cabinets, exposed conduit, pull and junction boxes, poles, surface metal raceways, etc. See Division 9, Finishes for material and installation requirements.

1.5 WORK FURNISHED AND INSTALLED UNDER ANOTHER SECTION REQUIRING CONNECTIONS UNDER THIS SECTION:

A. Provide electrical service, make requisite connections and perform operational test. Items furnished and installed under other sections and connected under this section, include but are not limited to the following:

1. Electric motors.
2. Package mechanical equipment: fans, fan coil units, pumps, boilers, duplex compressors, etc.
3. Irrigation controllers.
4. Hand dryers, hair dryers.

1.6 WORK NOT INCLUDED IN THIS DIVISION:

A. Items of work provided under another contract include, but are not necessarily limited to, the following:

1. Telephone cables and electronic equipment.

2. Data system cables, fittings, coverplates and electronic equipment.
3. Control wires for irrigation control valves.
4. Energy management/temperature control system; both line and low voltage including conductors and conduit.
5. Television monitors and projection equipment.
6. Security system equipment, cables, fittings, and coverplates.
7. CCTV cabling and electronic equipment.
8. MATV cabling and electronic equipment

1.7 INTERPRETATION OF DRAWINGS AND SPECIFICATIONS:

A. Before bidding, Contractor shall familiarize himself with the drawings, specifications and project site. Submit requests for clarification to Architect/Engineer in writing prior to issuance of final addendum. After signing the contract, the Contractor shall meet the intent, purpose, and function of the Contract Documents. Any costs of materials, labor and equipment arising therefrom, to make each system complete and operable, is the responsibility of the Contractor.

1.8 QUALITY ASSURANCE:

A. Reference to codes, standards, specifications and recommendations of technical societies, trade organizations and governmental agencies refers to the latest edition of such publications adopted and published prior to submittal of the bid proposed, unless noted otherwise herein. Such codes or standards are considered a part of this specification as though fully repeated herein.

B. When codes, standards, regulations, etc. allow work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred as reducing the quality, requirements or extent of the Drawings and Specifications. Perform work in accordance with applicable requirements of all governing codes, rules and regulations including the following minimum standards, whether statutory or not:

1. National Electric Code (NEC).
2. International Building Code (IBC).
3. International Fire Code (IFC).
4. International Mechanical Code (IMC).

C. Standards: Comply with the following standards where applicable for equipment and materials specified under this Division.

1.	UL	Underwriters' Laboratories
2.	ASTM	American Society for Testing Materials
3.	CBN	Certified Ballast Manufacturers
4.	IPCEA	Insulated Power Cable Engineers Association
5.	NEMA	National Electrical Manufacturer's Association
6.	ANSI	American National Standards Institute
7.	ETL	Electrical Testing Laboratories

D. All electrical apparatus furnished under this Section shall conform to (NEMA) standards and the NEC and bear the Underwriters' Laboratories (UL) label where such label is applicable.

E. Comply with requirements of State and Local Ordinances. If a conflict occurs between these requirements and the Contract Documents, the most stringent requirements shall govern. The Contractor accepts this responsibility upon submitting his bid, and no extra charge will be allowed after the contract is awarded. This shall not be construed as relieving the Contractor from complying with any requirements of the Contract Documents that may be in excess of the aforementioned requirements, and not contrary to same.

F. Obtain all permits, inspections, etc. required by authority having jurisdiction. Include all fees in bid. Furnish a certificate of approval to the Owner's Representative from the

Inspection Authority at completion of the work.

G. Employ only qualified craftsmen with at least three years of experience. Workmanship shall be neat, have a good mechanical appearance and conform to best electrical construction practices. Provide a competent superintendent to direct the work at all times. Any person found incompetent shall be discharged from the project and replaced by satisfactory personnel.

H. Contractor shall have a current state contracting license applicable to type of work to be performed under this contract.

1.9 CONSTRUCTION CHANGE ORDER PROPOSALS

A. In the event that a submission of a change order is issued by the contractor, the following information will be required to be submitted by the contractor, prior to any consideration by the owner/architect.

a. Where project manager or project engineer work is required, the labor cost shall not exceed 2% of the electrical portion of the change order.

b. All equipment, including conduit and wire, shall be itemized, identifying unit costs and quantities of equipment. Distributor quotes shall accompany all change order requests. The distributor quotes shall include costs for all equipment including conduit and wire. Lot pricing for equipment is not acceptable.

c. The general contractor shall review and confirm that the quantity and costs of materials submitted appear reasonable for the scope proposed.

d. Labor units shall not exceed base NECA 1 standards. No adjustment factors shall be approved.

e. Any research and labeling time, shall be the responsibility of the electrical contractor and shall not be included in the change order request.

f. Any costs associated with the purchase of tools or transportation shall be fully itemized for review by architect/owner.

g. Overtime rates shall only be approved where additional manpower cannot achieve the same result.

h. Change order form shall follow the following format:

i. PCO number

ii. Detailed description of work being performed

iii. Location on project where work is performed

iv. Chosen NECA column

v. Identified material:

1. QTY
2. Unit cost
3. Mark up
4. Material total

vi. Identified labor:

1. QTY
2. Unit cost
3. Composite labor rate
4. Labor total

1.10 RECORD DRAWINGS:

A. Maintain, on a daily basis, a complete set of “Record Drawings”, reflecting an accurate record of work in accordance with the following:

1. Show the complete routing and location of all feeders rated 100 amps and larger. Locate work buried below grade or under slab, work concealed above ceilings, and work in concealed spaces, dimensionally from fixed structural elements (not partition walls, etc.)

2. Show the complete routing and location of all telecommunications conduits, systems raceways, and empty raceways, 1-1/4" and larger. Locate work buried below grade or under slab, work concealed above ceilings, and work in

concealed spaces, dimensionally from fixed structural elements (not partition walls, etc.).

3. Show all changes, deviations, addendum items, change orders, job instructions, etc., that change the work from that shown on the contract documents, including wall relocations, fixtures and device changes, branch circuiting changes, etc. Where locations of boxes, raceways, equipment, etc. are adjusted in the field to fit conditions, but such new locations may not be obvious by referring to the contract document, show new locations on the record drawings.

B. At the discretion of the Architect/Engineer, the drawings will be reviewed on a periodic basis and used as a pre-requisite for progress payments. This requirement shall not be construed as authorization for the Contractor to make changes in the layout, or work without written authorization for such changes. The “Record Drawings” for daily recording shall consist of a set of blue line prints of the Contract Drawings.

C. Upon completion of the work, purchase a complete set of electronic drawings. Transfer all “Record” information from the blue line prints to the drawings via the current CAD program that it was written. The Architect/Engineer shall review the drawings and the Contractor shall incorporate the resulting comments into the final record drawings. The Contractor shall make two complete copies of the drawings electronically and forward this to the Engineer.

D. Certify the “Record Drawings” for correctness by placing and signing the following certifications of the first sheet of the drawings:

"CERTIFIED CORRECT (3/8" high letters)

(Name of General Contractor)

By: _____ Date: _____

(Name of Electrical Contractor)

By: _____ Date: _____

1.11 GUARANTEE:

A. Ensure that electrical system installed under this contract is in proper working order and in compliance with drawings, specifications, and/or authorized changes. Without additional charge, replace any work or materials that develop defect, except from ordinary wear and tear, within one year from the date of substantial completion. Exception: Incandescent and fluorescent lamps shall be guaranteed for a period of two months from the date of substantial completion.

PART 2 – PRODUCTS

2.1 GENERAL:

A. Products are specified by manufacturer name, description, and/or catalog number. Discrepancies between equipment specified and the intended function of equipment shall be brought to the attention of the Architect/Engineer in writing prior to bidding. Failure to report any conflict, including catalog numbers, discontinued products, etc., does not relieve the Contractor from meeting the intent of the contract documents nor shall it change the contract cost. If the Contractor is unable to interpret any part of the plans and/or specifications, or should he find discrepancies therein, he shall bring this to the attention of the Architect/Engineer who will issue interpretation and/or additional instructions to Bidders before the project is bid.

2.2 MANUFACTURERS:

A. Provide products of manufacturers specified. Manufacturers catalog numbers and descriptions establish the quality of product required. Substitutions will be considered if a duplicate written application (2-copies) is at the office of the Architect/Engineer eight (8)

working days prior to the day of the bidding. The application shall include the following: 1) A statement certifying that the equipment proposed is equal to that specified; that it has the same electrical and physical characteristics, compatible dimensions, and meets the functional intent of the contract documents; 2) The specified and submittal catalog numbers of the equipment under consideration; 3) A pictorial and specification brochure.

B. Any conflict arising from the use of substituted equipment shall be the responsibility of the Contractor, who shall bear all costs required to make the equipment comply with the intent of the contract documents.

C. Samples may be required for non-standard or substituted items before installation during construction. Provide all samples as required.

D. No materials or apparatus may be substituted after the bid opening except where the equipment specified has been discontinued.

E. Provide only equipment specified in the Contract Documents or approved by addendum.

2.3 SPARE PARTS:

A. Provide spare parts (fuses, diffusers, lamps, etc.) as specified. Transmit all spare parts to Owner's Representative prior to substantial completion.

PART 3 – EXECUTION

3.1 INSTALLATION:

A. Layout electrical work in advance of construction to eliminate unnecessary cutting, drilling, channeling, etc. Where such cutting, drilling, or channeling becomes necessary for proper installation; perform with care. Use skilled mechanics of the trades involved. Repair damage to building and equipment at no additional cost to the contract. Cutting work of other Contractors shall be done only with the consent of that Contractor. Cutting structural members shall not be permitted.

B. Provide equipment enclosures appropriate to the environment to which they are installed. For example, provide NEMA 3R for exterior enclosures and NEMA 1 for interior enclosures unless otherwise noted.

C. Since the drawings of floor, wall, and ceiling installation are made at small scale; outlets, devices, equipment, etc., are indicated only in their approximate location unless dimensioned. Locate outlets and apparatus symmetrically on floors, walls and ceilings where not dimensioned, and coordinate such locations with work of other trades to prevent interferences. Verify all dimensions on the job. Do not scale the electrical drawings, but refer to the architectural and mechanical shop drawings and project drawings for dimensions as applicable.

D. Perform for other trades, the electrical wiring and connection for all devices, equipment or apparatus. Consult Architectural, Mechanical, and other applicable drawings, and all applicable shop drawings to avoid switches, outlets, and other equipment from being hidden behind doors, cabinets, counters, heating equipment, etc., or from being located in chalkboards, tackboards, glass panels, etc. Relocate buried electrical devices and/or connections as directed at no additional cost.

E. Coordinate the location of outlets, devices, connections, and equipment with the supplier of the systems furniture prior to rough-in.

F. Where conduit, outlets or apparatus are to be encased in concrete, it must be located and secured by a journeyman or foreman present at the point of installation. Check locations of the electrical items before and after concrete and/or masonry installation and relocate displaced items.

G. Provide block-outs, sleeves, demolition work, etc., required for installation of work specified in this division.

3.2 CLEAN:

A. Clean up all equipment, conduit, fittings, packing cartons and other debris that is a direct result of the installation of the work of this Division.

B. Clean fixtures, interiors and exteriors of all equipment, and raceways. Replace all filters in electrical equipment upon request for Substantial Completion.

3.3 POWER OUTAGES:

A. All power outages required for execution of this work shall occur during non-standard working hours and at the convenience of the Owner. Include all costs for overtime work in bid.

B. Submit written request at least 7 days in advance of scheduled outage and proceed with outage only after receiving authorization from the Owner's Representative.

C. Keep all outages to an absolute minimum.

3.4 STORAGE AND PROTECTION OF MATERIALS:

A. Provide storage space for storage of materials and apparatus and assume complete responsibility for all losses due to any cause whatsoever. In no case shall storage interfere with traffic conditions in any public thoroughfare or constitute a hazard to persons in the vicinity. Protect completed work, work underway, and apparatus against loss or damage.

3.5 EXCAVATING FOR ELECTRICAL WORK:

A. General: Locate and protect existing utilities and other underground work in manner that will ensure that no damage or service interruption will result from excavating and backfilling. Perform excavation in a manner that protects walls, footings, and other structural members from being disturbed or damaged in any way. Burial depths must comply with NEC Section 300-5 (or State of Utah requirement, whichever is more stringent), unless noted otherwise on drawings.

B. Protect persons from injury at excavations, by barricades, warnings and illumination.

C. Coordinate excavations with weather conditions, to minimize possibility of washouts, settlements and other damages and hazards.

D. Provide temporary covering or enclosure and temporary heat as necessary to protect bottoms of excavations from freezing and frost action. Do not install electrical work on frozen excavation bases or sub-bases.

E. Do not excavate for electrical work until the work is ready to proceed without delay, so that total time lapse from excavation to completion of backfilling will be minimum. See other sections of specification for additional requirements for excavating.

F. Store excavated material (temporarily) near excavation, in a manner that will not interfere with or damage excavation or other work. Do not store under trees (within drip line).

G. Retain excavated material that complies with requirements for backfill material. Dispose of excavated material that is either in excess of quantity needed for backfilling or does not comply with requirements for backfill material. Remove unused material from project site, and dispose of in lawful manner.

3.6 BACKFILL MATERIALS:

A. For buried conduit or cable (other than below slab-on-grade, or concrete encased) - 2" thickness of well graded sand on all side of conduit or cable.

B. For trench backfill to within 6" of final grade - soil material suitable for compacting to required densities.

C. For top 6" of excavation - Top soil.

D. Backfill excavations in 8" high courses of backfill material, uniformly compacted to the following densities (percent of maximum density, ASTM D 1557), using power-driven hand-operated compaction equipment.

1. Lawn/Landscaped Areas: 85 percent for cohesive soils, 95 percent for cohesionless soils.
2. Paved Areas, Other than Roadways (90 percent for cohesive soils, 95 percent for cohesionless soils).

E. Subsidence: Where subsidence is measurable or observable at electrical work excavations during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality and condition of the surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.7 ROOF PENETRATIONS:

A. Where raceways penetrate roofing or similar structural area, provide appropriate roof jack coordinate with the roofing contractor and the Architect in order to match the vent with the roof construction. The jack shall be sized to fit tightly to raceway for weather-tight seal, and with flange extending a minimum of 9" under roofing in all sides or as required by the roof type of construction. Completely seal opening between inside diameter of roof flashing and outside diameter of penetrating raceways. Coordinate all work with work required under roofing section of specifications.

3.8 PROJECT FINALIZATION AND START-UP:

A. Upon completion of equipment and system installation, assemble all equipment Factory Representatives and Subcontractors for system start-up.

B. Each Representative and Subcontractor shall assist in start-up and check out their respective system and remain at the site until the total system operation is accepted by the Owner's representative.

C. The Factory Representative and/or System Subcontractor shall give personal instruction on operating and maintenance of their equipment to the Owner's maintenance and/or operation personnel. To certify acceptance of operation and instruction by the Owner's Representative, the contractor shall prepare a written statement as follows:

1. This is to certify that the Factory Representative and System Subcontractor for each of the systems listed below have performed start-up and final check out of their respective systems.
2. The Owner's Representative has received complete and thorough instruction in the operation and maintenance of each system.

SYSTEM	FACTORY REPRESENTATIVE
(List systems included)	(List name and address of Factory Representative)

Owner's Representative	Contractor

D. Send copy of acceptance to Architect/Engineer.

3.9 FINAL REVIEW:

A. At the time of final review, the project foreman shall accompany the reviewing party, and remove coverplates, panel covers and other access panels as requested, to allow review of the entire electrical system.

END OF SECTION 26 0500

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PART 1 SECTION 26 0502

PART 2 ELECTRICAL SUBMITTALS AND SPARE PARTS

PART 3 – GENERAL

3.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to all Division 26, 27 and 28 sections.

B. Architectural, Structural, Mechanical and other applicable documents are considered a part of the electrical documents insofar as they apply as if referred to in full. Contractor must review the entire set of plans and specifications. Reviewing only the electrical set is not acceptable.

C. Consult all other sections, determine the extent and character of related work and properly coordinate work specified herein with that specified elsewhere to produce a complete installation.

3.2 SUBMITTAL REQUIREMENTS:

A. GENERAL:

1. After the Contract is awarded but prior to ordering, manufacture, or installation of any equipment, prepare complete Submittals including shop drawings, product data, brochures, etc. for materials and equipment as required by each section of the specification.
2. Review of Submittals shall not relieve the Contractor of responsibility for dimensions and/or errors that may be contained therein, or deviations from the Contract Document's requirements. It shall be clearly understood that the noting of some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings and Brochures, the requirements of the Contract Document's shall govern and are not waived, or superseded in any way by the review of the Shop Drawings and Brochures.
3. Submittals are reviewed, not approved. Comments made within submittals do not alter the contract documents in any way. The contractor is still responsible, regardless of comments (if any) made within submittals, for complying with drawings and specifications.
4. Notify engineer in writing if any of the comments noted in the submittals alter the contract cost. A comment within the submittal process which increases/decreases cost of product is not an authorization to the contractor under any circumstances to proceed.
5. Notify engineer of any modifications between contract documents and submittals. It is the responsibility of the contractor to ensure compliance.
6. ELECTRONIC SUBMITTAL REQUIREMENTS:
   a. Provide submittals in Portable Document Format (PDF).
   b. Documents must be electronically bookmarked by Division e.g. 26, 27 and 28, Specification section e.g. 26 0510 and individually for each item submitted for light fixtures, switchgear, transformer, panelboard etc. and keyword searchable using Adobe Acrobat (http://www.adobe.com/acrobat) or Bluebeam Revu (http://www.bluebeam.com) for each relevant section.
   c. Electronically highlight all options for light fixtures, electrical equipment, etc. Manual highlighting and scanning of the documents is NOT acceptable and will NOT be reviewed.

d. Provide only completed cutsheets for all fixture and equipment types. Blank cutsheets submitted with a schedule are NOT acceptable and will NOT be reviewed.

e. At the time of submission, the electrical contractor shall provide a complete and comprehensive submission of all required specification sections/shop drawings at the same time. Exceptions may be given, with prior approval, for time-sensitive equipment.

f. A maximum of one submittal per specification section is allowed. It is NOT acceptable to provide a product by product submittal. Single product by product submittals will NOT be reviewed.

B. SCHEDULING

1. GENERAL

a. A minimum period of two weeks, exclusive of transmittal time, will be required each time Submittals are submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling submittal data.

b. If the shop drawings are rejected twice, the contractor shall reimburse the engineering firm the sum of $1,200.00 for the third review and any additional reviews required prior to the commencement of additional review.

C. QUALITY ASSURANCE

1. PRE-SUBMITTAL PREPARATION

a. Prior to submission of the Shop Drawings and Project Data, review and certify that they are in compliance with the Contract Documents. Verify all dimensional information to ensure proper clearance for installation of equipment.

b. Shop drawings requiring the use of electronic documents (floor plans, Lighting plans, fire alarm plans, etc.) shall be requested via a request for information (RFI) through the general contractor. Electronic documents will be provided to the Architect for distribution. No direct vendor requests will be accepted.

c. Contractor is completely responsible for the content of the submittal

2. SUBMITTAL REQUIREMENTS

a. Provide a stamp or statement on each submittal as follows:

i. I hereby certify that this Shop Drawing and/or Brochure has been checked prior to submittal and that it complies in all respects with the requirements of the Contract Drawings and Specifications for this Project.

(Name of Electrical Subcontractor)

Name_____.

Position_____Date_____

i. Failure to provide certification will result in submittals being rejected and returned without review.

b. Brochures to be submitted as supplementary information shall be published by the Manufacturers and shall contain complete and detailed engineering and dimensional information. Brochures submitted shall contain only information relevant to the particular equipment or materials to be furnished. The Contractor shall not submit catalogs that describe several different items in addition to those items to be used, unless all irrelevant information is marked out, or unless relevant information is

clearly marked. Brochures from each manufacturer shall be identified and submitted separately.

c. Shop Drawings shall be done in an easily legible scale and shall contain sufficient plans, elevations, sections, and isometrics to clearly describe the equipment or apparatus, and its location. Drawings shall be prepared by an Engineer/Draftsmen skilled in this type of work. Shop Drawings shall be drawn to at least 1/4" = 1'0" scale.

d. Observe the following rules when submitting the Shop Drawings and Brochures.

i. Each Shop Drawing shall indicate in the lower right hand corner, and each Brochure shall indicate on the front cover the following: Title of the sheet or brochure, name and location of the building; names of the Architect and Electrical Engineer, Contractor, Subcontractors, Manufacturer, Supplier/Vendor, etc., date of submittal, and the date of correction and revision. Unless the above information is included the submittal will be rejected and returned without being reviewed.

1. Submittal Identification shall include the following:

a. A unique number, sequentially assigned, shall be noted on the transmittal form accompanying each item submitted.

b. Original submittal numbers shall have the following format: “XXX-Y;” where “XXX” is the originally assigned submittal number and “Y” is a sequential letter assigned for resubmittals (for example, A, B, or C being the first, second, and third resubmittals, respectively). Submittal 25B, for example, is the second resubmittal of Submittal 25.

D. POST-SUBMITTAL

1. Check all materials and equipment after arrival on the job site and verify compliance with the Contract Documents.

3.3 PROVIDE SUBMITTALS AS REQUESTED FOR EACH OF THE SECTIONS LISTED BELOW:

A. 26 0519 Conductors and Cables

1. (600V and Below)

a. Submit megohmmeter test data for circuits under 600 volts. Megger all

B. 26 0526 Grounding

1. Submit the name of test agency to be used for testing specified in this section. Submit results of tests specified in this section. Also include test results in Operation and Maintenance Manuals as specified.

C. 26 0532 Conduit Raceway

1. Submit manufacturer’s data on MC-PCS Power & Control/Signal Cable.

D. 26 0533 Electrical Boxes and Fittings

1. Submit manufacturer’s data including specifications, installation instruction and general recommendations for each type of floor box used on project.

E. 26 0548 Electrical Seismic Control

1. A single submittal shall be provided for all seismic anchorage and restraints for all Division 26 equipment and systems provided as part of this project. Individual submittals for specific systems will not be accepted.

2. Submit shop drawings, calculations, and printed data for the following items under provisions of the General Conditions of the Contract:

   a. Complete engineering calculations and shop drawings for all seismic requirements for all equipment to be restrained as outlined in Section 26 0548 Specification, and as detailed on drawings.

   b. The professional seal of the engineer who is responsible for the design of the Seismic Restraint System.

   c. Details for all seismic bracing.

   d. Details for steel frames, concrete inertia bases, and housekeeping pads. Include dimensions, embed depths, dowelling details, and concrete reinforcing requirements.

   e. Clearly outlined procedures for installing and adjusting the isolators, seismic bracing anchors, snubbers, cables, and bolt connections.

   f. Floor plan noting the locations, size, and type of anchorage and restraint to be used.

   g. Include confirmation that all calculations are based on the design criteria listed in appropriate Section.

   h. Certificate of Compliance.

   i. Where equipment is exempt per this specification provide a written certificate of compliance for each of the systems noted with the professional seal of engineer who has reviewed the electrical system.

F. 26 0553 Electrical Identification

1. Submit manufacturer’s data on each type of electrical identification products

   a. Submit one sample of each component of the electrical identification system as follows: Wire/cable tape marker, Tags, Engraved, plastic laminate labels, Arc-flash hazard labels

G. 26 0923 Occupancy Sensors

1. Submit manufacturer's data on occupancy sensors, control modules, wiring diagrams, instructions for installation, interconnection diagrams and any related accessories.

2. Submit scaled drawings with lighting fixtures shown and sensor equipment/devices clearly marked by manufacturer showing proper product, location, coverage pattern and orientation of each sensor.

H. 26 2416 Panelboards

1. Submit dimensioned drawings of panelboards and enclosures showing accurately scaled layouts of enclosures and required individual panelboard devices, including but not necessarily limited to, circuit breakers, fusible switches, fuses, ground-fault circuit interrupters, and accessories.

2. Submit manufacturer data including specifications, installation instructions and general recommendations, for each type of panelboard required.

I. 26 2713 Service Entrance

1. Submit manufacturer's data on service-entrance equipment and accessories.

2. Submit dimensioned layouts of service-entrance equipment and spatial

relationships to proximate equipment. Failure to submit said layouts shall not relieve contractor of responsibility to verify required clearances before release of equipment to fabrication.

J. 26 2726 Wiring Devices

1. Submit manufacturer's data on electrical wiring devices.

K. 26 2815 Overcurrent Protective Devices

1. Submit manufacturer's data on overcurrent protective devices, including catalog cuts, time-current trip characteristic curves, and mounting requirements.

2. Submit layout drawings of overcurrent protective devices, with layouts of circuit breakers, including spatial relationships to proximate equipment. Failure to submit said spatial layouts does not relieve contractor of responsibility to verify all required clearances before release of equipment for fabrication.

3. Submit time-current trip curves (in log-log format) and trip setting parameter/range information (for each trip function) for all solid-state circuit breakers.

4. Manufacturer shall also provide recommended trip settings with the shop drawing submittal (including ground fault settings) for coordination with downstream overcurrent devices. Manufacturer shall base recommendations on the AIC rating of the electrical equipment.

5. Where the Protective Device Study specification section 260573 is included in the project, the time-current curves and recommended trip settings for all solid-state circuit breakers shall be submitted as part of the protective device study.

L. 26 2816 Motor and Circuit Disconnects

1. Submit manufacturer's data including specifications, installation and general recommendations, for each type of motor and circuit disconnect switch required.

2. Submit dimensioned drawings of electrical motor and circuit disconnect switches that have rating of 100 amperes and larger.

M. 26 2819 Scoreboards

1. Submit manufacturer's data on scoreboard including, but not limited to, roughing-in diagrams and instructions for installation, operation and maintenance, suitable for inclusion in maintenance manuals. Also include standard or typical riser and wiring diagrams.

N. 26 5100 Interior and Exterior Building Lighting

1. Submit manufacturer's data on interior and exterior building lighting fixtures.

2. Submit dimensioned drawings of lighting fixtures. Submit fixture shop drawings in PDF format with separate sheet for each fixture, assembled in luminaire "type" alphabetical order, with each “type” individually bookmarked, with proposed fixture catalog number and accessories clearly indicated on each sheet.

3. When applicable submit standard color samples with the shop drawings. If standard colors are not acceptable, a color sample will be provided to the fixture manufacturer. Return of the shop drawings will be delayed until color samples are provided.

4. Submit ballast and/or driver manufacturer cut sheets.

5. Submit a list of all lamps used on projects.

3.4 OPERATION & MAINTENANCE MANUALS

A. Provide operating instruction and maintenance data books for all equipment and materials furnished under this Division.

B. Submit four copies of operating and maintenance data books for review at least four weeks before final review of the project. Assemble all data in a completely indexed volume or volumes and identify the size, model, and features indicated for each item. The binder (sized to the material) shall be a 2" slide lock unit (Wilson-Jones WLJ36544B). The cover shall be engraved with the job title in 1/2" high letters and the name and address of the Contractor in 1/4" high letters. Provide the same information in 1/8" letters on the spine.

C. Include complete cleaning and servicing data compiled in clearly and easily understandable form. Show serial numbers of each piece of equipment, complete lists of replacement parts, motor ratings, etc. Each unit shall have its own individual sheet. (Example: If two items of equipment A and D appear on the same sheet, an individual sheet shall be provided for each unit specified).

D. Include the following information where applicable.

1. Identifying name and mark number.
2. Certified outline Drawings and Shop Drawings.
3. Parts lists.
4. Performance curves and data.
5. Wiring diagrams.
6. Light fixture schedule with the lamps and ballast data used on the project for all fixtures
7. Manufacturer's recommended operating and maintenance instructions.
8. Vendor's name and address for each item.

E. The engineer shall review the manuals and when approved, will forward the manuals on to the architect. If the manuals are rejected twice, the contractor shall reimburse the engineer the sum of $1,200.00 for each review afterwards.

F. Provide Operation and Maintenance Manual information for each section listed below in addition to the general requirements listed above.

1. 26 0526 Grounding
   a. Test Results of measured resistance values
2. 26 0548 Electrical Seismic Control
   a. Certificate of Compliance from Final Inspection
3. 26 0923 Occupancy Sensors
   a. Record Drawings
      i. A complete set of ‘as-builts’ drawings showing installed wiring, specific interconnections between all equipment, and internal wiring of this equipment shall be included in the operating and maintenance manuals upon complete of the system.
      ii. Provide a CD to the owner containing the information specified below. The CD shall include all information required to allow the Owner to change the schedules themselves. The CD shall contain a minimum of following:
         1. CAD drawing files of ‘as-built’ lighting control components and point to point connections.
         2. General configuration programming.
         3. Job specific configuration programming to include schedule.
         4. Tutorial file on complete programming of lighting control system.

4. 26 2913 Motor Starters

Section	Section Name	Description	Qty. Required	Qty. Received	Fulfilled?
26 0532	Conduit Raceway		Per description		
26 0923	Occupancy Sensors	Spare sensors for each type used on project.	5 per type		
26 2816	Motor and Circuit Disconnects	Spare fuses amounting to one spare fuse for each 10 installed but not less than three of any one type and size.	Per description		
26 2913	Motor Starters	Maintenance Stock Fuses: For types and ratings required, furnish additional fuses, amounting to one unit for every 10 installed, but not less than 5 units of each, for both power and control circuit fuses.	Per description		
26 5100	Interior and Exterior Building Lighting	Spare diffusers (acrylic and/or glass only) for each fixture type. One set shall be provided per fixture type and one additional per every (10) fixtures of each type; quantity shall not exceed (10) spares for any single fixture type.	Per description		

a. After installation is complete, including water and air balancing, measure voltage (L-L and L-N) and full load current of each phase of each motor. Submit report showing field readings of voltage, amperage, service factor, and thermal heater size installed for each motor.

3.5 SPARE PARTS:

A. Provide spare parts (fuses, diffusers, lamps, etc.) as specified. Stock of all spare items shall be delivered as directed to Owner's storage space prior to substantial completion. All components shall be labeled to match construction document nomenclature.

B. Review with Owner/Architect and revise as needed for each project.

END OF SECTION 26 0502

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SECTION 260507

ELECTRICAL CONNECTIONS FOR EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-23 section making reference to electrical connections.

1.2 DESCRIPTION OF WORK:

A. Extent of electrical connection for equipment includes final electrical connection of all equipment having electrical requirements. Make final connections for all owner furnished equipment. See other applicable portions of specification for building temperature control wiring requirements.

B. Refer to Division-23 sections for motor starters and controls furnished integrally with equipment; not work of this section.

C. Refer to Division-23 section for control system wiring; not work of this section.

D. Refer to sections of other Divisions for specific individual equipment power requirements.

1.3 QUALITY ASSURANCE:

A. NEC COMPLIANCE: Comply with applicable portions of NEC as to type products used and installation of electrical power connections.

B. UL LABELS: Provide electrical connection products and materials that have been UL-listed and labeled.

PART 2 - PRODUCTS

2.1 GENERAL:

A. For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, raceways, conductors, cords, cord caps, wiring devices, pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices, terminations, and connections as required. Crimp on or slip-on type splicing materials (insulation displacement type) designed to be used without wire stripping are not acceptable. See Section 26 0532, Conduit Raceways; Section 26 2726 Wiring Devices: and Section 26 0519 Conductors and Cables for additional requirements. Provide final connections for equipment consistent with the following:

1. Permanently installed fixed equipment - flexible seal-tite conduit from branch circuit terminal equipment, or raceway; to equipment, control cabinet, terminal junction box or wiring terminals. Totally enclose all wiring in raceway.
2. Movable and/or portable equipment - wiring device, cord cap, and multi-conductor cord suitable for the equipment and in accordance with NEC requirements (Article 400).
3. Other methods as required by the National Electrical Code and/or as required by special equipment or field conditions.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL CONNECTIONS:

A. Make electrical connections in accordance with connector manufacturer's written instructions and with recognized industry practices, and complying with requirements of NEC and NECA's "Standard of Installation" to ensure that products fulfill requirements.

B. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams.

C. Coordinate installation of electrical connections for equipment with equipment installation work.

D. Verify all electrical loads (voltage, phase, horse power, full load amperes, number and point of connections, minimum circuit ampacity, etc.) for equipment furnished under other Divisions of this specification, by reviewing respective shop drawings furnished under each division. Meet with each subcontractor furnishing equipment requiring electrical service and review equipment electrical characteristics. Report any variances from electrical characteristics noted on the electrical drawings to Architect before proceeding with rough-work. In summary it is not in the Electrical Engineers scope to review the shop drawings from other trades/divisions.

E. Obtain and review the equipment shop drawings to determine particular final connection requirements before rough-in begins for each equipment item.

F. Refer to basic materials and methods Section 26 0553 Electrical Identification, Conductors, for identification of electrical power supply conductor terminations.

END OF SECTION 26 0507

SECTION 26 0519

CONDUCTORS AND CABLES (600V AND BELOW)

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to conductors and cables specified herein.

1.2 DESCRIPTION OF WORK:

A. Extent of electrical conductor and electrical cable work is indicated by drawings and schedules.

B. Types of conductors and cables in this section include the following:

1. Copper Conductors (600V)

C. Applications for conductors and cables required for project include:

1. Power Distribution
2. Feeders
3. Branch Circuits

1.3 RECORDS SUBMITTAL:

Refer to Section 26 0502 for requirements.

1.4 QUALITY ASSURANCE:

A. Comply with NEC as applicable to construction and installation of electrical conductors and cable. Comply with UL standards and provide electrical conductors and cables that have been UL-listed and labeled.

B. Comply with applicable portions of NEMA/Insulated Cable Engineers Association standards pertaining to materials, construction and testing of conductors and cable.

C. Comply with applicable portions of ANSI/ASTM and IEEE standards pertaining to construction of conductors and cable.

1.5 SUBMITTALS:

Refer to Section 26 0502 for requirements.

PART 2 - PRODUCTS

2.1 COPPER CONDUCTORS (600V):

A. Provide factory-fabricated conductors of sizes, ratings, materials, and types indicated for each service. Where not indicated provide proper selection to comply with project's installation requirements and NEC standards. Provide conductors in accordance with the following:

1. Service Entrance Conductors – [Copper] conductor; see drawings for insulation type.
2. Distribution and Panelboard Feeders; and Other Conductors, #2 AWG and Larger – [Copper] conductor; see drawings for insulation type.
3. Branch Circuit Conductors and All Conductors #3 AWG and Smaller - Copper conductor, with THHN/THWN insulation. Size all conductors in accordance with NEC; minimum size to be #12 AWG. Provide solid conductors for #10 AWG and smaller. Provide stranded conductors for #8 AWG and larger.

B. Provide a maximum of three phase conductors in any one conduit or as approved by electrical engineer. Where phase conductors share a common neutral they must have a means to simultaneously disconnect all ungrounded conductors at the point where the branch circuits originate. The ungrounded and neutral conductors of a multi-wire branch circuit must be grouped together by wire ties at the point of origination.

C. Provide neutral and ground wire as specified elsewhere in documents.

D. Provide separate neutral conductor for all single phase branch circuits installed. No shared neutrals are allowed. Neutral conductor shall be the same size as the phase conductor.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General: Install electric conductors and cables as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standards of Installation", and in accordance with recognized industry practices.

B. Coordinate installation work with electrical raceway and equipment installation work, as necessary for proper interface.

C. Cables may be pulled by direct attachment to conductors or by use of basket weave pulling grip applied over cables. Attachment to pulling device shall be made through approved swivel connection. Nonmetallic jacketed cables of small size may be pulled directly by conductors by forming them into a loop that pull wires can be attached; remove insulation from conductors before forming the loop. Larger sizes of cable may be pulled by using basket weave pulling grip, provided the pulling force does not exceed limits recommended by manufacturer; if pulling more than one cable, bind them together with friction tape before applying the grip. For long pulls requiring heavy pulling force, use pulling eyes attached to conductors.

D. Do not exceed manufacturer's recommendations for maximum allowable pulling tension, side wall pressure, and minimum allowable bending radius. In all cases, pulling tension applied to the conductors shall be limited to 0.008 lbs. per circular mil of conductor cross-section area.

E. Pull in cable from the end having the sharpest bend; i.e. bend shall be closest to reel. Keep pulling tension to minimum by liberal use of lubricant, and turning of reel, and slack feeding of cable into duct entrance. Employ not less than one man at reel and one in pullhole during this operation.

F. For training of cables, minimum bend radius to inner surface of cable shall be 12 times cable diameter.

G. Where cable is pulled under tension over sheaves, conduit bends, or other curved surfaces, make minimum bend radius 50% greater than specified above for training.

H. Use only wire and cable pulling compound recommended by the specific cable manufacturer, and that is listed by UL.

I. Seal all cable ends unless splicing is to be done immediately. Conduit bodies shall not contain splices.

J. Support all cables in pullholes, concrete trenches, and similar locations by cable racks

K. Follow manufacturer's instructions for splicing and cable terminations.

3.2 AFTER INSTALLATION TEST FOR CABLE 600 VOLTS AND BELOW:

A. Prior to energization, test cable and wire for continuity of circuitry, and for short circuits, Megger all circuits of 100 amp and greater rating. Correct malfunctions. Record all test data and provide written test report.

B. Subsequent to wire and cable connections, energize circuitry and demonstrate functioning in accordance with requirements.

3.3 IDENTIFICATION OF FEEDERS: Refer to Section 26 0553 for requirements.

END OF SECTION 26 0519

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SECTION 26 0526

GROUNDING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Division-26 Basic Materials and Methods sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

A. Provide grounding as specified herein, and as indicated on drawings.

B. Provide grounding and bonding of all electrical and communication apparatus, machinery, appliances, building components, and items required by the NEC to provide a permanent, continuous, low impedance, grounding system.

C. Unless otherwise indicated, ground the complete electrical installation including the system neutral, metallic conduits and raceways, boxes, fittings, devices, cabinets, and equipment in accordance with all code requirements.

D. Ground each separately derived system, as described in NEC Section 250-30, unless otherwise indicated.

E. Types of grounding in this section include the following:

1. Underground Metal Water Piping
2. Metal Building Frames
3. Grounding Electrodes
4. Grounding Rods
5. Service Equipment
6. Enclosures
7. Systems
8. Equipment
9. Other items indicated on drawings

F. Requirements of this section apply to electrical grounding work specified elsewhere in these specifications.

1.3 QUALITY ASSURANCE:

A. Comply with NEC as applicable to electrical grounding and ground fault protection systems. Comply with applicable ANSI and IEEE requirements. Provide products that have been UL listed and labeled.

B. Resistance from the service entrance ground bus, through the grounding electrode to earth, shall not exceed 5 ohms.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS

2.1 MATERIALS AND COMPONENTS:

A. GENERAL: Except as otherwise indicated, provide each electrical grounding system as specified herein, and as shown on drawings, including but not necessarily limited to,

cables/wires, connectors, terminals (solderless lugs), grounding rods/electrodes and plate electrodes, bonding jumper braid, and other items and accessories needed for complete installation. Where materials or components are not otherwise indicated, comply with NEC, NEMA and established industry standards for applications indicated.

B. ELECTRICAL GROUNDING CONDUCTORS: Unless otherwise indicated, provide electrical grounding conductors for grounding connections matching power supply wiring materials and sized according to NEC. Provide with green insulation.

C. GROUND RODS: Steel with copper welded exterior, 3/4" dia. x 10' long. Weaver or Cadweld.

D. GROUND WELL BOXES FOR GROUND RODS: Precast concrete box 9-1/2" W. x 16" L. X 18" D. with light duty concrete cover for non-traffic areas or rated steel plate for traffic areas. Provide covers with lifting holes. Engrave cover with "GROUND ROD".

E. CONCRETE ENCASED GROUNDING ELECTRODE (UFER GROUND): #2/0 AWG bare copper conductor.

F. INSULATED GROUNDING BUSHINGS: Plated malleable iron body with 150 degree Centigrade molded plastic insulating throat, lay-in grounding lug with hardened stainless steel fasteners, OZ-Gedney BLG, or Thomas & Betts #TIGB series.

G. CONNECTIONS TO PIPE: For cable to pipe, OZ-Gedney G-100B series or Thomas & Betts #390X series, or Burndy type GAR.

H. CONNECTIONS TO STRUCTURAL STEEL, GROUND RODS, OR SPLICES: For splicing and/or connecting conductors, use exothermic welds or high pressure compression type connectors. Provide exothermic weld kits manufactured by Cadweld or Thermoweld. If high compression type connectors are used for cable-to-cable, or cable-to-steel, or cable-to-ground rod connections, provide Thomas & Betts #53000 series, or Burndy Hyground series.

I. BONDING JUMPERS: OZ-Gedney Type BJ, or Thomas & Betts #3840 series, or Burndy type GG and type B braid.

PART 3 - EXECUTION

3.1 INSTALLATION OF GROUNDING SYSTEMS:

A. Install electrical grounding systems in accordance with manufacturer's written instructions and with recognized industry practices to ensure grounding devices comply with requirements.

B. Install clamp-on connectors only on thoroughly cleaned and metal contact surfaces, to ensure electrical conductivity and circuit integrity.

C. Provide grounding for the entire raceway, enclosure, equipment and device system in accordance with NEC. All raceways shall include copper grounding conductor sized in accordance with NEC.

D. Provide service entrance grounding by means of ground rods (quantity of two, driven exterior to building), by means of bonding to water main, and by means of bonding to building structural steel. In addition, provide a grounding electrode for not less than 30 lineal feet in concrete footing or foundation that is in direct contract with earth. Size electrode in accordance with NEC, but in no case, smaller than No. 4 AWG bare copper. Support electrode so as to be below finished grade near the bottom of the trench, and approximately three inches from the bottom or sides of the concrete. Locate a point of connection for inspection.

3.2 GROUNDING ELECTRODES:

A. Concrete Encased Grounding Electrode (UFER Ground): Provide a #2/0 AWG minimum bare copper conductor encased along the bottom of concrete foundation or footings that

are in direct contact with the earth and where there is no impervious water-proofing membrane between the footing and the soil. Extend electrode through a horizontal length of 30 feet minimum and encase with not less than 2 nor more than 5 inches of concrete separating it from surrounding soils. At point of emergence from concrete, run electrode through a protective non-metallic sleeve and extend to the main building reference ground bus.

B. GROUNDING ELECTRODE CONDUCTOR: Provide grounding electrode conductor sized per NEC table 250-94 or as indicated.

C. POWER SYSTEM GROUNDING: Connect the following items using NEC sized copper grounding conductors to lugs on the Service Ground Bus.

1. Grounding electrode conductor from concrete encased electrode, and from ground rods, from service entrance ground bus.
2. Conductor from main incoming cold water piping system.
3. Conductor from building structural steel.
4. Ground for separately derived systems.

D. Run main grounding conductors exposed or in metallic conduit if protection or concealment is required.

E. EQUIPMENT BONDING/GROUNDING: Provide a NEC sized conductor, whether indicated or not on the drawings, in raceways as follows:

1. Non-metallic conduits and ducts.
2. Distribution feeders.
3. Motor and equipment branch circuits.
4. Device and lighting branch circuits.
5. Provide grounding bushings and bonding jumpers for all conduit terminating in reducing washers, concentric, eccentric or oversized knockouts at panelboards, cabinets and gutters.

F. Provide bonding jumpers across expansion and deflection couplings in conduit runs, across pipe connections at water meters, and across dielectric couplings in metallic cold water piping system.

G. Provide bonding wire in all flexible conduit.

3.3 TESTING:

A. Obtain and record ground resistance measurements both from service entrance ground bus to the ground electrode and from the ground electrode to earth. Install additional bonding and grounding electrodes as required to comply with resistance limits specified under this Section.

B. Include typewritten records of measured resistance values in the Operation and Maintenance Manual.

C. Use independent testing agency for all testing.

D. Use test equipment expressly designed for the purpose intended. Submit name of testing agency for review and approval, in writing, to the Engineer prior to the performance of any testing.

END OF SECTION 26 0526

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SECTION 26 0529

SUPPORTING DEVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

B. This section is a Division-26 Basic Materials and Methods section, and is a part of each Division-26, 27 and 28 section making reference to supports, anchors, sleeves, and seals, specified herein.

1.2 DESCRIPTION OF WORK:

A. Extent of supports, anchors, and sleeves is indicated by drawings and schedules and/or specified in other Division-26 sections. See Section 260532, Raceways, for additional requirements.

B. Work of this section includes supports, anchors, sleeves and seals required for a complete raceway support system, including but not limited to: clevis hangers, riser clamps, C-clamps, beam clamps, one and two hole conduit straps, offset conduit clamps, expansion anchors, toggle bolts, threaded rods, U-channel strut systems, threaded rods and all associated accessories.

1.3 QUALITY ASSURANCE:

A. Comply with NEC as applicable to construction and installation of electrical supporting devices. Comply with applicable requirements of ANSI/NEMA Std. Pub No. FB 1, "Fittings and Supports for Conduit and Cable Assemblies". Provide electrical components that are UL-listed and labeled.

PART 2 - PRODUCTS

2.1 MANUFACTURED SUPPORTING DEVICES:

A. GENERAL:

1. Provide supporting devices; complying with manufacturer's standard materials, design and construction in accordance with published product information, and as required for a complete installation; and as herein specified. See drawings for additional requirements.

PART 3 - EXECUTION

3.1 INSTALLATION OF SUPPORTING DEVICES:

A. Install hangers, anchors, sleeves, and seals as required, in accordance with manufacturer's written instructions and with recognized industry practices to ensure supporting devices comply with requirements. Comply with requirements of NECA, NEC and ANSI/NEMA for installation of supporting devices.

B. Coordinate with other electrical work, including raceway and wiring work, as necessary to interface installation of supporting devices with other work.

C. Install hangers, supports, clamps and attachments to support piping properly from building structures. Arrange for grouping of parallel runs of horizontal conduits to be supported together on trapeze type hangers where possible. For pre-and post tensioned construction, use pre-set inserts for support of all electrical work. Do not use toggle bolts, moly bolts, wood plugs or screws in sheetrock or plaster as support for any equipment or raceway.

D. RACEWAYS:

1. Support raceways that are rigidly attached to structure at intervals not to exceed 8 feet on center, minimum of two straps per 10 foot length of raceway, and within 12" of each junction box, coupling, outlet or fitting. Support raceway at each 90° degree bend. Support raceway (as it is installed) in accordance with the following:

NUMBER OF RUNS	3/4" TO 1-1/4" 0	1-1/2" & LARGER 0
1	Full straps, clamps or hangers.	Hanger
2	Full straps, clamps or hangers.	Mounting Channel
3 or more	Mounting Channel	Mounting Channel

2. Support suspended raceways on trapeze hanger systems; or individually by means of threaded rod and straps, clamps, or hangers suitable for the application. Do not use "tie wire" as a portion of any raceway support system; do not support raceway from ceiling support wires.

END OF SECTION 26 0529

SECTION 26 0532

CONDUIT RACEWAY

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to electrical raceways and specified herein.

1.2 DESCRIPTION OF WORK:

A. Extent of raceways is indicated by drawings and schedules.

B. Types of raceways in this section include the following:

1. Electrical Metallic Tubing
2. Flexible Metal Conduit
3. Liquid-tight Flexible Metal Conduit
4. Rigid Non-metallic Conduit

1.3 QUALITY ASSURANCE:

A. MANUFACTURERS: Firms regularly engaged in manufacture of raceway systems of types and sizes required, whose products have been in satisfactory use in similar service for not less than three (3) years.

B. STANDARDS: Comply with applicable portions of NEMA standards pertaining to raceways. Comply with applicable portions of UL safety standards pertaining to electrical raceway systems; and provide products and components that have been UL-listed and labeled. Comply with NEC requirements as applicable to construction and installation of raceway systems.

C. SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS

2.1 METAL CONDUIT AND TUBING:

A. GENERAL:

1. Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) as indicated; with minimum trade size of 3/4".

B. RIGID METAL CONDUIT (RMC): FS WW-C-0581 and ANSI C80.1.

C. INTERMEDIATE STEEL CONDUIT (IMC): FS WW-C-581.

D. PVC EXTERNALLY COATED RIGID STEEL CONDUIT: ANSI C80.1 and NEMA Std. Pub. No. RN 1.

E. ALUMINUM CONDUIT: Not acceptable.

F. MC CABLE: Not acceptable.

G. RIGID AND INTERMEDIATE STEEL CONDUIT FITTINGS:

1. Provide fully threaded malleable steel couplings; raintight and concrete tight where required by application. Provide double locknuts and metal bushings at all conduit terminations. Install OZ Type B bushings on conduits 1-1/4" and larger.

H. ELECTRICAL METALLIC TUBING (EMT): FS WW-C-563 and ANSI C80.3.

I. EMT FITTINGS:

1. Provide insulated throat nylon bushings with non-indenter type malleable steel fittings at all conduit terminations. Install OZ Type B bushings on conduits 1" larger. Cast or indenter type fittings are not acceptable.

J. FLEXIBLE METAL CONDUIT: FS WW-C-566, of the following type;

1. Zinc-coated steel.

K. FLEXIBLE METAL CONDUIT FITTINGS: FS W-F-406, Type 1, Class 1, and Style A.

L. LIQUID TIGHT FLEXIBLE METAL CONDUIT:

1. Provide liquid-tight, flexible metal conduit; constructed of single strip, flexible continuous, interlocked, and double-wrapped steel; galvanized inside and outside; coated with liquid-tight jacket of flexible polyvinyl chloride (PVC).

M. LIQUID-TIGHT FLEXIBLE METAL CONDUIT FITTINGS: FS W-F-406, Type 1, Class 3, Style G.

N. EXPANSION FITTINGS: OZ Type AX, or equivalent to suit application.

2.2 NON-METALLIC CONDUIT AND DUCTS:

A. GENERAL:

1. Provide non-metallic conduit, ducts and fittings of types, sizes and weights as indicated; with minimum trade size of 3/4".

B. UNDERGROUND PVC PLASTIC UTILITIES DUCT:

1. Minimum requirements shall be schedule 40 for encased burial in concrete and for Type II for direct burial.

C. PVC AND ABS PLASTIC UTILITIES DUCT FITTINGS:

D. ANSI/NEMA TC 9, match to duct type and material.

E. HDPE CONDUIT: Not acceptable.

2.3 CONDUIT; TUBING; AND DUCT ACCESSORIES:

A. Provide conduit, tubing and duct accessories of types and sizes, and materials, complying with manufacturer's published product information, that mate and match conduit and tubing. Provide manufactured spacers in all duct bank runs.

2.4 SEALING BUSHINGS:

A. Provide OZ Type FSK, WSK, or CSMI as required by application. Provide OZ type CSB internal sealing bushings.

2.5 CABLE SUPPORTS:

A. Provide OZ cable supports for vertical risers, type as required by application.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL RACEWAYS:

A. Install electrical raceways where indicated; in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA "Standard of Installation", and in accordance with the following:

1. SERVICE ENTRANCE CONDUCTORS, AND CONDUCTORS OVER 600 VOLTS:

   a. Install in rigid metal conduit (RMC), or intermediate metal conduit (IMC); except where buried below grade, install in non-metallic conduit or duct, individually encased in concrete. See duct banks.

2. FEEDERS UNDER 600 VOLTS:

   a. Install feeders to panels and motor control centers and individual equipment feeders rated 100 amps and greater, in rigid metal conduit (RMC), or intermediate metal conduit (IMC), or Electrical Metallic Tubing (EMT); except where buried below grade, install in non-metallic conduit or duct.

3. BRANCH CIRCUITS, SIGNAL AND CONTROL CIRCUITS, AND INDIVIDUAL EQUIPMENT CIRCUITS RATED LESS THAN 100 AMPS:

   a. Install in electric metallic tubing (EMT). Below concrete slab-on-grade or in earth fill, install in non-metallic plastic duct. In areas exposed to weather, moisture, or physical damage, install in RMC or IMC. Encase non-metallic duct 40-amp circuits, 1-1/4" and larger in concrete. See duct banks.

B. Coordinate with other work including metal and concrete deck work, as necessary to interface installation of electrical raceways and components.

C. Install raceway in accordance with the following:

1. Provide a minimum of 12" clearance measured from outside of insulation from flues, steam and hot water piping, etc. Avoid installing raceways in immediate vicinity of boilers and similar heat emitting equipment. Conceal raceways in finished walls, ceilings and floor (other than slab-on-grade), except in mechanical, electrical and/or communication rooms, conceal all conduit and connections to motors, equipment, and surface mounted cabinets unless exposed work is indicated on the drawings. Run concealed conduits in as direct a line as possible with gradual bends. Where conduit is exposed in mechanical spaces, etc., install parallel with or at right angles to building or room structural lines. Do not install lighting raceway until piping and duct work locations have been determined in order to avoid fixtures being obstructed by overhead equipment.

2. Where cutting raceway is necessary, remove all inside and outside burrs; make cuts smooth and square with raceway. Paint all field threads (or portions of raceway where corrosion protection has been damaged) with primer and enamel finish coat to match adjacent raceway surface.

3. Provide a minimum of 1 ½” from nearest surface of the roof decking to raceway.

4. Provide a maximum of three phase conductors in any one conduit or as approved by electrical engineer. Where phase conductors share a common neutral they must have a means to simultaneously disconnect all ungrounded conductors at the point where the branch circuits originate. The ungrounded and neutral conductors of a multi-wire branch circuit must be grouped together by

wire ties at the point of origination. Provide neutral and ground wire as specified elsewhere in documents.

5. Provide separate neutral conductor for all single phase branch circuits installed. No shared neutrals are allowed. Neutral conductor shall be the same size as the phase conductor.

D. Comply with NEC for requirements for installation of pull boxes in long runs.

E. Cap open ends of conduits and protect other raceways as required against accumulation of dirt and debris. Pull a mandrel and swab through all conduit before installing conductors. Install a 200 lb. nylon pull cord in each empty conduit run.

F. Replace all crushed, wrinkled or deformed raceway before installing conductors.

G. Do not use flame type devices as a heat application to bend PVC conduit. Use a heating device that supplies uniform heat over the entire area without scorching the conduit.

H. Provide rigid metal conduit (RMC) for all bends greater than 22 degrees in buried conduit. Provide protective coating for RMC bend as specified herein.

I. Where raceways penetrate building, area ways, manholes or vault walls and floors below grade, install rigid metal conduit (RMC) for a minimum distance of 10 feet on the exterior side of the floor or wall measured from interior face. Provide OZ, Type FSK, WSK or CSMI sealing bushings (with external membrane clamps as applicable) for all conduit penetrations entering walls or slabs below grade. Provide segmented type CSB internal sealing bushings in all raceways penetrating building walls and slabs below grade, and in all above grade raceway penetrations susceptible to moisture migration into building through raceway.

J. Install liquid-tight flexible conduit for connection of motors, transformers, and other electrical equipment where subject to movement and vibration.

K. Provide OZ expansion fittings on all conduits crossing building expansion joints, both in slab and suspended.

L. Provide OZ cable supports in all vertical risers in accordance with NEC 300-19; type as required by application.

M. Complete installation of electrical raceways before starting installation of cables/conductors within raceways.

N. Raceway installation below grade:

1. Apply protective coating to metallic raceways in direct contact with earth or fill of any type; consisting of spirally wrapped PVC tape (1/2" minimum overlap of scotch wrap tape or equal); or factory applied vinyl cladding (minimum thickness .020 inches). Completely wrap and tape all field joints.

2. Burial depths must comply with NEC Section 300-5 but in no case be less than 24", unless noted otherwise on drawings.

O. Raceway installation below slab-on-grade, or below grade:

1. For slab-on-grade construction, install runs of rigid plastic conduit (PVC) below slab. All raceway shall be located a minimum of 8” below bottom of slab. Install RMC (with protective coating) for raceways passing vertically through slab-on-grade. Slope raceways as required to drain away from electrical enclosures and to avoid collection of moisture in raceway low points.

2. Apply protective coating to metallic raceways in direct contact with earth or fill of any type; consisting of spirally wrapped PVC tape (1/2" minimum overlap of scotch wrap tape or equal); or factory applied vinyl cladding (minimum thickness .020 inches). Completely wrap and tape all field joints.

3. Mark all buried conduits that do not require concrete encasement by placing yellow plastic marker tape (minimum 6" wide) along entire length of run 12" below final grade. Where multiple small lines are buried in a common trench and do not exceed an overall width of 16", install a single line marker.

4. Burial depths must comply with NEC Section 300-5 but in no case be less than 24", unless noted otherwise on drawings.

P. Electrical Identification: Refer to Section 260553 for requirements.

Q. SPARE PARTS: Refer to Section 26 0502 for requirements.

END OF SECTION 26 0532

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SECTION 26 0533

ELECTRICAL BOXES AND FITTINGS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specifications sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is a part of each Division-26, 27 and 28 section making reference to electrical wiring boxes and fittings specified herein. See Section 260532, Raceways, for additional requirements.

1.2 DESCRIPTION OF WORK:

A. The extent of electrical box and electrical fitting work is indicated by drawings and schedules.

B. Types of electrical boxes and fittings in this section include the following:

1. Outlet Boxes
2. Junction Boxes
3. Pull Boxes
4. Conduit Bodies
5. Bushings
6. Locknuts
7. Knockout Closures
8. Miscellaneous Boxes and Fittings

1.3 QUALITY ASSURANCE:

A. Comply with NEC as applicable to construction and installation of electrical boxes and fittings. Comply with ANSI C 134,1 (NEMA Standards Pub No. OS 1) as applicable to sheet-steel outlet boxes, device boxes, covers and box supports. Provide electrical boxes and fittings that have been UL-listed and labeled.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 - PRODUCTS

2.1 FABRICATED MATERIALS:

A. INTERIOR OUTLET BOXES:

1. Provide one piece, galvanized flat rolled sheet steel interior outlet wiring boxes with accessory rings, of types, shapes and sizes, including box depths, to suit each respective location and installation, construct with stamped knockouts in back and sides, and with threaded screw holes with corrosion-resistant screws for securing box and covers and wiring devices; minimum size 4"x4"x2-1/8".
2. Provide an ‘FS’ box, with no knockouts when surface mounted in a finished, non-utility space. Surface mounting is only acceptable when approved by the Architect.

B. INTERIOR OUTLET BOX ACCESSORIES:

1. Provide outlet box accessories as required for each installation, including mounting brackets, hangers, extension rings, fixture studs, cable clamps and

metal straps for supporting outlet boxes, that are compatible with outlet boxes being used and fulfilling requirements of individual wiring applications.

C. WEATHERPROOF OUTLET BOXES:

1. Provide corrosion-resistant cast-metal weatherproof outlet wiring boxes, of types, shapes and sizes (including depth) required, with threaded conduit ends, cast-metal face plates with spring-hinged waterproof caps suitably configured for each application, with face plate gaskets and corrosion-resistant fasteners.

D. JUNCTION AND PULL BOXES:

1. Provide code-gage sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws and washers.

E. CONDUIT BODIES:

1. Provide galvanized cast-metal conduit bodies, of types, shapes and sizes to suit respective locations and installation, construct with threaded-conduit-entrance ends, removable covers, and corrosion-resistant screws.

F. BUSHINGS, KNOCKOUT CLOSURES AND LOCKNUTS:

1. Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and malleable steel conduit bushings and offset connectors, of types and sizes to suit respective uses and installation.

PART 3 - EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS:

A. GENERAL:

1. Install electrical boxes and fittings where indicated, complying with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.
2. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.
3. Provide coverplates for all boxes. See Section 262726, Wiring Devices.
4. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.
5. Provide knockout closures to cap unused knockout holes where blanks have been removed.
6. Install boxes and conduit bodies to ensure ready accessibility of electrical wiring. Do not install boxes above ducts or behind equipment. Install recessed boxes with face of box or ring flush with adjacent surface. Seal between switch, receptacle and other outlet box openings and adjacent surfaces with plaster, grout, or similar suitable material.
7. Fasten boxes rigidly to substrates or structural surfaces, or solidly embed electrical boxes in concrete or masonry. Use bar hangers for stud construction. Use of nails for securing boxes is prohibited. Set boxes on opposite sides of common wall with minimum 10" of conduit between them. Set boxes on opposite sides of fire resistant walls with minimum of 24” separation.
8. Provide a minimum of 1 ½” from the nearest surface of the roof decking to the installed boxes.
9. Provide electrical connections for installed boxes.

END OF SECTION 26 0533

SECTION 26 0548

ELECTRICAL SEISMIC CONTROL

PART 1 – GENERAL

1.1 WORK INCLUDED:

A. Anchorage and seismic restraint systems for all Division 26 isolated and non-isolated equipment, cable tray, and conduit systems.

B. Anchorage and seismic restrain systems for electrical components shall include but not be limited to the following:

1. Conduit
2. Light Fixtures

1.2 RELATED WORK:

A. Requirements: Provide Electrical Seismic Control in accordance with the Contract Documents.

B. Section 260500 – Electrical General Provisions

1.3 REFERENCES:

A. International Building Code, Current Edition in use by Jurisdictional Authority.

B. NFPA Bulletin 90A, Current Edition.

C. UL Standard 181.

D. ASCE 7-10

1.4 SYSTEM DESCRIPTION

A. The Division 26 Contractor shall be responsible for supplying and installing equipment, vibration isolators, flexible connections, rigid steel frames, anchors, inserts, hangers and attachments, supports, seismic snubbers and bracing to comply with the following:

1. Short period design spectral response acceleration coefficient SDS=0.70.
2. One second period design spectral response acceleration coefficient SD1=0.28.
3. Site Class B.
4. Seismic Design Category D.
5. Importance Factor (Ip) = 1.0 1.5

B. Seismic Restraint Exceptions

1. The following components are exempt from the requirements of this section

1.5 QUALITY ASSURANCE:

A. All supports, hangers, bases, anchorage and bracing for all isolated equipment and non-isolated equipment shall be designed by a professional engineer licensed in the state where the project is located, employed by the restraint manufacturer, qualified with seismic experience in bracing for electrical equipment. Shop drawings submitted for earthquake bracing and anchors shall bear the Engineer's signed professional seal. All calculations/design work required for the seismic anchorage and restraint of all Division 26 equipment and systems shall be provided by a single firm.

B. The above qualified seismic engineer shall determine specific requirements for equipment anchorage and restraints, locations and sizes based on shop drawings for the electrical equipment that have been submitted, reviewed and accepted by the

Architect/Engineer for this project.

C. Seismic Engineer or the Engineer's Representative shall field inspect final installation and certify that bracing and anchorage are in conformance with the Seismic Engineer's design. A certificate of compliance bearing the Seismic Engineer's signed Professional Engineer's seal shall be submitted and shall be included in each copy of the Operation and Maintenance Manuals.

D. The Division 26 Contractor shall require all equipment suppliers furnish equipment that meets the seismic code, with bases/skids/curb designed to receive seismic bracing and/or anchorage. All isolated and non-isolated electrical equipment bracing to be used in the project shall be designed from the Equipment Shop Drawings and certified correct by the equipment manufacturer for seismic description listed in Paragraph 1.4 above, with direct anchorage capability.

1.6 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS:

2.1 RESTRAINT EQUIPMENT AND SYSTEMS:

A. Acceptable Manufacturers and Suppliers for Non-Isolated Systems:

1. Mason Industries, Inc.
2. Korfund
3. Amber/Booth Company
4. Vibration Mountings and Control Company
5. Kinetics
6. International Seismic Application Technology
7. Tolco

B. Manufacture and design of restraints and anchors for isolated equipment shall be by the manufacturer of the vibration isolators furnished for the equipment.

2.2 SNUBBERS:

A. Snubbers shall be all-directional and consist of interlocking steel members restrained by replaceable shock absorbent elastomeric materials a minimum of 3/4 inch thick.

B. Snubbers shall be manufactured with an air gap between hard and resilient material of not less than 1/8 inch or more than 1/4 inch.

C. Snubbers shall be Mason Industries Z -1011 or accepted equivalent.

PART 3 – EXECUTION

3.1 DESIGN AND INSTALLATION:

A. General:

1. All electrical components shall be braced, anchored, snubbed or supported to withstand seismic disturbances in accordance with the criteria of this specification. Provide all engineering, labor, materials, and equipment for protection against seismic disturbances as specified herein. The following electrical components are exempt from seismic restraint requirements.
   a. Electrical components in Seismic Design Category A or B (see section 1.4)

   b. Electrical components in Seismic Design Category C provided that the component importance factor, I_p, is equal to 1.0 (see section 1.4).

c. Electrical components in Seismic Design Categories D, E, or F where all of the following apply:

i. The component importance factor, I_p, is equal to 1.0;

ii. The component is positively attached to the structure;

iii. Flexible connections are provided between the component and associated ductwork, piping, and conduit; and either

1. The component weighs 400 lb (1,780 N) or less and has a center of mass located 4 ft (1.22 m) or less above the adjacent floor level; or

2. The component weighs 20 lb (89 N) or less or, in the case of a distributed system, 5 lb/ft (73 N/m) or less.

2. Powder-actuated fasteners (shot pins) shall not be used for component anchorage in tension applications in Seismic Design Category D, E, or F.

3. Attachments and supports for electrical equipment shall meet the following provisions:

a. Attachments and supports transferring seismic loads shall be constructed of materials suitable for the application and designed and constructed in accordance with a nationally recognized structural code such as, when constructed of steel, AISC, Manual of Steel Construction (Ref. 9.8-1 or 9.8-2).

b. Friction clips shall not be used for anchorage attachment.

c. Expansion anchors shall not be used for electrical equipment rated over 10 hp (7.45 kW). Exception: Undercut expansion anchors.

d. Drilled and grouted-in-place anchors for tensile load applications shall use either expansive cement or expansive epoxy grout.

e. Supports shall be specifically evaluated if weak-axis bending of light-gauge support steel is relied on for the seismic load path.

f. Components mounted on vibration isolation systems shall have a bumper restraint or snubber in each horizontal direction. The design force shall be taken as 2Fp. The intent is to prevent excessive movement and to avoid fracture of support springs and any non- ductile components of the isolators.

g. Seismic supports shall be constructed so that support engagement is maintained.

B. Conduit, Conduit Racks/Trapeze Assemblies

1. Seismic braces for be omitted when the distance from the supporting structure to the raceway support point is 12” or less. Where rod hangers are used, they shall be equipped with swivels to prevent inelastic bending in the rod.

2. Seismic braces may be omitted where the total weight of the assembly is less than 10 lb/ft.

3. Seismic braces for individual conduit may be omitted for conduit less than 2.5 inch trade size.

4. A rigid conduit system shall not be braced to dissimilar parts of a building or two dissimilar building systems that may respond in a different mode during an earthquake. Examples: Wall and a roof; solid concrete wall and a metal deck with lightweight concrete fill.
5. Unbraced conduit attached to in-line equipment shall be provided with adequate flexibility to accommodate differential displacements.
6. At the interface of adjacent structures or portions of the same structure that may move independently, utility lines shall be provided with adequate flexibility to accommodate the anticipated differential movement between the ground and the structure.
7. Provide large enough pipe sleeves through wall or floors to allow for anticipated differential movements.
8. For spaces, where the Importance Factor (Ip) is equal to 1.5, all electrical components that are attached to structures that could displace relative to one another and for isolated structures where components cross the isolation interface, the components shall be designed to accommodate the eismic relative dispalcements.

C. Light Fixtures

1. Light fixtures, lighted signs, and ceiling fans not connected to ducts or piping, which are supported by chains or otherwise suspended from the structure, are not required to satisfy the seismic force and relative displacement requirements provided they meet all of the following criteria:
   a. The design load for such items shall be equal to 1.4 times the operating weight acting down with a simultaneous horizontal load equal to 1.4 times the operating weight. The horizontal load shall be applied in the direction that results in the most critical loading for the design.
   b. Seismic interaction effects shall not cause an effect so that the failure of the non-essential component causes a failure of an essential component.
   c. The connection to the structure shall allow a 360° range of motion in the horizontal plane.
   d. The component is less than 20 lbs and has flexible connections and an importance factor (Ip) equal to 0.

END OF SECTION 26 0548

SECTION 26 0553

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Requirements of the following Division 26 Sections apply to this section:

1. “Basic Electrical Requirements”.
2. “Basic Electrical Materials and Methods”.

1.2 SUMMARY

A. This section includes identification of electrical materials, equipment and installations. It includes requirements for electrical identification components including but not limited to the following:

1. Buried electrical line warnings.
2. Identification labels for raceways, cables and conductors.
3. Operational instruction signs.
4. Warning and caution signs.
5. Equipment labels and signs.
6. Arc-flash hazard labels

B. Related Sections: The following sections contain requirements that relate to this section:

C. Division 9 Section “Painting” for related identification requirements.

D. Refer to other Division 26 sections for additional specific electrical identification associated with specific items.

1.3 QUALITY ASSURANCE

A. Electrical Component Standard: Components and installation shall comply with NFPA 70 “National Electrical Code”

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. American Labelmark Co.
2. Calpico, Inc.
3. Cole-Flex Corp.
4. Emed Co., Inc.
5. George-Ingraham Corp.
6. Ideal Industries, Inc.
7. Kraftbilt
8. LEM Products, Inc.
9. Markal Corp

10. National Band and Tag Co.
11. Panduit Corp.
12. Radar Engineers Div., EPIC Corp.
13. Seton Name Plate Co.
14. Standard Signs, Inc.
15. W.H Brady, Co.

2.2 ELECTRICAL IDENTIFICATION PRODUCTS

A. Colored Conduit Systems for raceway identification:
   1. Factory-painted conduit and/or factory-painted couplings and fittings

B. Colored paint for raceway identification:
   1. Use Kwal Paint colors as specified in Part 3 – Execution.

C. Color Adhesive Marking Tape for Raceways, Wires and Cables:
   1. Self-adhesive vinyl tape not less than 3 mills thick by 1” to 2” in width.

D. Underground Line Detectable Marking Tape:
   1. Permanent, bright colored, continuous-printed, acid- and alkali-resistant plastic tape specifically compounded for direct-burial service. Not less than 6” wide by 4 mills thick.
   2. With metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep.
   3. Printed legend indicative of general type of underground line below.

E. Wire/Cable Designation Tape Markers:
   1. Vinyl or vinyl-cloth, self-adhesive, wraparound, cable/conductor markers with pre-printed numbers and letters.

F. Brass or Aluminum Tags:
   1. Metal tags with stamped legend, punched for fastener.
   2. Dimensions: 2” X 2” 19 gage.

G. Engraved, Plastic Laminated Labels, Signs and Instruction Plates:
   1. Engraving stock plastic laminate, 1/16” minimum thickness for signs up to 20 sq. in. or 8” in length; 1/8 “ thick for larger sizes. Engraved legend in 1/4” high white letters on black face and punched for mechanical fasteners.

H. Arc-flash Hazard Labels:
   1. ANSI Z535.4 Safety Label.
   2. Adhesive backed polyester with self-laminating flap. Chemical, abrasion and heat resistant.
   3. Dimensions: 5” x 3.5”
   4. Information contained: Arc-flash boundary; Voltage; Flash Hazard Category; Incident Energy (arc rating); checkboxes for the required Personal Protective Equipment (PPE) and the date that the calculations were performed.

I. Equipment Labels:
   1. Adhesive backed polyester with self-laminating flap. Chemical, abrasion and heat resistant.
   2. Dimensions: minimum 5” x 2”
   3. Conductor-Identification-Means Labels:

a. Information contained: the method utilized for identifying ungrounded conductors within switchboards, distribution panels and branch circuit panels.

4. Available-Fault-Current Labels:

a. Information contained: maximum available fault current at the respective piece of equipment, and date of calculation of fault current.

5. Source-of-Supply Labels:

a. Information contained: indicate the device or equipment where the power supply originates.

J. Baked Enamel Warning and Caution Signs for Interior Use:

1. Preprinted aluminum signs, punched for fasteners, with colors legend and size appropriate to location.

K. Fasteners for Plastic-Laminated and Metal Signs:

1. Self-tapping stainless steel screws or # 10/32 stainless steel machine screws with nuts, flat and lock washers.

L. Cable Ties:

1. Fungus-inert, self-extinguishing, one-piece, self-locking nylon cable ties, 0.18" minimum width, 50-lb. Minimum tensile strength, and suitable for a temperature range from minus 40° F. to 185° F. Provide ties for specified colors when used for color coding.

M. Colored Support Wires:

1. When electrical equipment/wiring is supported by wires within the ceiling cavity, these wires shall be independent of the ceiling support assembly and shall be distinguishable by painting entire length in bright yellow.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Lettering and Graphics:

1. Coordinate names, abbreviations, colors and other designations used in electrical identification work with corresponding designations specified or indicated. Install numbers, lettering and colors as approved in submittals and as required by code.

B. Install identification devices in accordance with manufacturer's written instructions and requirements of NEC.

C. Sequence of Work:

1. Where identification is to be applied to surfaces that require a finish, install identification after completion of finish work.

D. Conduit Identification:

1. Identify Raceways of Certain Systems with Color Coding. Acceptable means of color identification are as follows:

a. Colored adhesive marking tape.

b. Field-painted colored bands.

c. Factory-painted conduit.

d. Color exposed or accessible raceways of the following systems for identification. Make each color band 2 inches wide, completely encircling conduit. Apply bands at changes in direction, at penetrations of walls and floors, and at 20-foot maximum intervals in straight runs. Apply the following colors:

i. Fire Alarm System: Red
ii. Sound/IC: Blue
iii. Telephone: Yellow
iv. Data: Green
v. MATV: Black
vi. Security: Orange

2. Identify Junction, Pull and Connection Boxes.

a. Code-required caution sign for boxes shall be pressured-sensitive, self-adhesive label indication system voltage in black, preprinted on orange background. Install on outside of box cover. Also label box covers on outside of cover with identity of contained circuits. Use pressure-sensitive plastic labels at exposed locations and similar labels or plasticized card stock tags at concealed boxes.

3. Label and paint the covers of the systems junction boxes as follows:

SYSTEM	COLOR (ALL COLORS ARE KWAL PAINT)	
Fire Alarm	Red Alert	AC118R
Sound/IC	Neon Blue	7076A
Telephone	Competition Yellow	7225A
Data	Java Green	AC098N
MATV	Flat Black	
Security	Fiesta Orange	AC107Y

E. Underground Electrical Line Identification.

1. During trench backfilling, for exterior underground power, signal, and communications lines, install continuous underground line detectable marking tape, located directly above line at 6 to 8 inches below finished grade. Where multiple lines are installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.

2. Install detectable marking tape for all underground wiring, both direct-buried and in raceway.

3. Provide red marker dye applied to concrete encased ductbank.

F. Conductor Color Coding.

1. Provide color coding for secondary service, feeder and branch circuit conductors throughout the project secondary electrical system as follows:

CONDUCTOR	208Y / 120V System	480Y / 277V System
Phase A	Black	Brown
Phase B	Red	Orange
Phase C	Blue	Yellow
Shared/Single Neutral	White	Gray
Neutral A (dedicated)	White w/Black Stripe	Gray w/Black Stripe
Neutral B (dedicated)	White w/Red Stripe	Gray w/Orange Stipe
Neutral C (dedicated)	White w/Blue Stripe	Gray w/Yellow Stipe
Equipment Ground	Green	Green
Isolated Ground	Green w/Yellow Strip	Green w/Yellow Stripe

2. Switch legs, travelers and other wiring for branch circuits shall be of colors other than those listed above.

3. Use conductors with color factory applied the entire length of the conductors except as follows:

   a. The following field-applied color-coding methods may be used in lieu of factory-coded wire for sizes larger than No. 10 AWG.

   b. Apply colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors as specified. Do not obliterate cable identification markings by taping. Tape locations may be adjusted slightly to prevent such obliteration.

   c. In lieu of pressure-sensitive tape, colored cable ties may be used for color identification. Apply three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten for snug fit, and cut off excess length.

G. Power Circuit Identification.

1. Securely fasten identifying metal tags or aluminum wraparound marker bands to cables, feeders, and power circuits in vaults, pull boxes, junction boxes, manholes, and switchboard rooms with 1/4-inch steel letter and number stamps with legend to correspond with designations on Drawings. If metal tags are provided, attach them with approximately 55-lb monofilament line or one-piece self-locking nylon cable ties.

2. Tag or label conductors as follows:

   a. Future Connections: Conductors indicated to be for future connection or connection under another contract with identification indicting source and circuit numbers.

   b. Multiple Circuits: Where multiple branch circuits or control wiring or communications/ signal conductors are present in the same box or enclosure (except for three-circuit, four-wire home runs), label each conductor or cable. Provide legend indicating source, voltage, circuit number, and phase for branch circuit wiring. Phase and voltage of branch circuit wiring may be indicated by mean of coded color of conductor insulation. For control and communications/signal wiring, use color coding or wire/cable marking tape at terminations and at intermediate locations where conductors appear in wiring boxes, troughs, and control cabinets. Use consistent letter/number conductor designations throughout on wire/cable marking tapes.

3. Match identification markings with designations used in panelboards shop drawings, Contract Documents, and similar previously established identification schemes for the facility's electrical installations.

H. Apply warning, caution and instruction signs and stencils as follows:

1. Install warning, caution, or instruction signs where required by NEC, where indicated, or where reasonably required to assure safe operation and maintenance of electrical systems and of the items they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions or explanations are needed for system or equipment operation. Install butyrate signs with metal backing for outdoor items. Warning and caution signs shall be furnished and installed on, but not be limited to the following equipment and locations:

a. Entrances to rooms and other guarded locations that contain exposed live parts 600 volts or less; signs shall forbid unqualified personnel to enter.

b. Switch and Overcurrent device enclosures with splices, taps and feed-through conductors. Provide warning label on the enclosures that identifies the nearest disconnecting means for any feed-through conductors.

c. Entrances to buildings, vaults, rooms or enclosures containing exposed live parts or exposed conductors operating at over 600 volts: DANGER-HIGH VOLTAGE-KEEP OUT.

d. Metal-enclosed switchgear, unit substations, transformers, enclosures, pull boxes, connection boxes and similar equipment operating at over 600 volts shall have appropriate caution signs and warning labels.

e. Indoor and Outdoor substations operating over 600 volts. Provide warning signs, instructional signs and single-line diagrams in accordance with NEC 225.70.

I. Emergency Operating Signs: Install engraved laminated signs with white legend on red background with minimum 3/8-inch high lettering for emergency instructions on power transfer, load shedding, or other emergency operations.

J. Install equipment/system circuit/device identification as follows:

1. Apply equipment identification labels of engraved plastic-laminate on each major unit of electrical equipment in building, including central or master unit of each electrical system. This includes communication/signal/alarm systems, unless unit is specified with its own self-explanatory identification. Except as otherwise indicated, provide single line of text, with 1/4“-high lettering on 1-inch-high label (1 1/2-inch-high where two lines are required) white lettering in black field. White lettering in red field for Emergency Power Systems. Text shall match terminology and numbering of the Contract Documents and shop drawings. Apply labels for each unit of the following categories of electrical equipment.

a. Each service disconnect, to identify it as a service disconnect.

b. Panelboards (exterior and interior), electrical cabinets, and enclosures. For subpanels, identify feeder circuit served from.

c. Switches in fusible panelboards shall be labeled. Main switches shall be identified.

d. Access doors and panels for concealed electrical items.

e. Motor starters, including circuit origination, HP, heater size, FLA, and mechanical equipment designation.

f. Disconnect switches.

g. Lighting Control Equipment.

K. Post Conductor-Identification-Means labels at locations of switchboards, distribution panels and branch circuit panels. The labels shall identify the color-coding used on ungrounded conductors for each voltage system used on the premises.

L. Apply Available-Fault-Current labels at the service entrance equipment.

M. Apply Source-of-Supply labels on the exterior covers of equipment (except in single- or two-family dwellings) as follows:

1. Each switchboard supplied by a feeder.

2. Each branch circuit panelboard supplied by a feeder.

3. Each disconnect switch serving elevators, escalators, moving walks, chairlifts, platform lifts and dumbwaiters.

4. Each dry type transformer (or primary-side disconnect switch at transformer). If the primary-side disconnect is remote from the transformer, both the remote

disconnect and the transformer shall be labeled, and the transformer label shall also indicate the location of the disconnect.

5. Each feeder disconnect, branch circuit disconnect, panelboard or switchboard in a remote building or structure.

6. Each on-site emergency power source, with sign placed at service entrance equipment to comply with NEC 700.

N. The label shall identify the device or equipment where the power supply originates, and the system voltage and phase. For example: Feeder Power Supply for Panel “XX” Originates at Panel “XX” (or Switchboard “XX”, Transformer “XX”, Switch “XX”, etc.); 120/208 volts, 3-phase (or 120/240, 277/480, etc.).

O. Install Arc-flash hazard labels on the following equipment:

1. Each piece of service entrance equipment.
2. Each power distribution switchboard or panel.
3. Each individually mounted circuit breaker.
4. Each branch circuit panelboard.
5. Each motor control center.
6. Each individually mounted motor starter.
7. Each meter socket enclosure.

P. Apply circuit/control/item designation labels of engraved plastic laminate for disconnect switches, breakers, pushbuttons, pilot lights, motor control centers, and similar items for power distribution and control components above, except panelboards and alarm/signal components, where labeling is specified elsewhere.

Q. Install labels at locations indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

R. Engrave all receptacle plates other than those serving 120 volt, single phase devices. State voltage and amperage characteristics: Example; “208V 30A”.

S. Mark each device box (for each type of wiring device) with a permanent ink felt tip marker, indicating the circuit that the device is connected to: Example; “CKT A-1”

T. Label circuit breaker feeding fire alarm panel “Fire Alarm Circuit”. Using plastic laminate label, white lettering on a red background.

END OF SECTION 26 0553

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SECTION 26 0923

OCCUPANCY SENSORS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to wiring devices specified herein.

1.2 DESCRIPTION OF WORK:

A. The extent of occupancy sensor work is indicated by drawings and schedules.

B. Types of occupancy sensors in this section include the following:

1. Control Pack
2. Dual Technology Wall Switch
3. Dual Technology Ceiling Sensor w/ Control Pack

1.3 QUALITY ASSURANCE:

A. Comply with NEC and NEMA standards as applicable to construction and installation of occupancy sensors. Provide occupancy sensors that have been UL listed and labeled.

B. All sensors shall be capable of operating normally with electronic ballasts, PL lamp systems, motor loads and any other passive infrared or microwave systems.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURER: The manufacturer shall have a minimum of five years of experience in the sensor and lighting control industry. Sensors and related relays shall be compatible with the specific lighting types controlled. All sensors shall be of the same manufacturer, mixing brands of sensors is not acceptable.

A. DUAL TECHNOLOGY WALL SWITCH: Where units are indicated provide a sensor that meets the following minimum requirements:

1. Sensor shall utilize PIR (Passive Infrared) to turn on the lights and then PIR or US (Ultrasonic) technologies to keep lights on.
2. Sensor shall incorporate an inrush current limiter circuit to protect the relay contacts.
3. Sensor shall utilize single or dual dry relay contacts for control of the lighting loads. Contractor shall verify requirements in coordination with the drawings.
4. Sensor shall have a self-adjusting time delay, selectable 5, 15 and 30 minutes.
5. Sensor shall have automatic sensitivity adjustment and be microprocessor controlled.
6. Sensor shall have light level sensing 0 to 200 footcandles.
7. Sensor shall have a 180 degree field of view, coverage up to 800 square feet and shall detect 6 inches of hand movement towards the sensor up to 300 square feet; and body motion towards the sensor up to 1000 square feet.
8. Sensor shall be rated for 0 to 800 watts at 120VAC and 0 to 1200 watts at 277VAC.

9. Sensor shall be automatic on and shall have an automatic to off override switch on the unit. Switch shall be equipped with an air gap switch to disconnect power to the lighting load.
10. Sensor shall have real time motion indicator on the front of the unit.
11. Sensor shall mount to a single gang switch box.
12. Subject to compliance with the above requirements. Provide models of one of the following:
    a. Greengate ONW-D

B. DUAL TECHNOLOGY CEILING SENSOR: Where units are indicated, provide a sensor that meets the following minimum requirements:

1. Sensor shall incorporate ultrasonic (microphonics) and infrared technologies in a single unit.
2. Sensor shall be Class 2, low voltage; capable of mounting in the ceiling for maximum coverage.
3. Sensor shall use internal microprocessor for motion signal analysis and automatic self-adjustment.
4. Sensor shall have automatic self-adjustment algorithm that adjusts timer and sensitivity settings to maximize performance and minimize energy usage.
5. Sensor shall have manual time-out adjustment from 8 minutes to 32 minutes and automatic time out from 8 minutes to 100 minutes.
6. Sensor shall have test time-out setting of 8 seconds, with automatic return to 8 minutes after one hour if sensor is left in test mode.
7. Sensor's microprocessor shall automatically extend timer by 1 hour in response to recognition to false off condition. After 5 hours, sensor reduces extended time by 30 minutes and continues to reduce by 30 minute increments over the next few days.
8. Sensor's microprocessor shall automatically reduce either PIR or ultrasonic sensitivity in response to false on condition.
9. Sensor microprocessor will automatically monitor PIR background threshold signal level and makes corresponding sensitivity adjustments automatically.
10. Sensor microprocessor algorithm shall incorporate automatic adaptation to continuous airflow.
11. For airflow that is so intense as to mask motion, sensor shall flash indicator LED code to indicate excessive airflow.
12. Sensor's microprocessor shall use a four week learning period and develop a circadian calendar.
13. An internal 24 hour 7 day clock establishes what periods the room is typically occupied, biasing sensor to keep lights on while normally occupied and off when normally unoccupied.
14. Sensor shall have selection settings for the following dual technology schemes:
    a. High Sensitivity and High Confidence (miser mode)
15. Sensor shall be available with either 180 degrees or 360 degrees coverage pattern.
16. Infrared lens shall have 360 degree field of view. Two types of lens shall be available, standard and extra dense.
17. Sensor shall have a variety of mask inserts for PIR coverage rejection to prevent false tripping.
18. Transducers shall be protected from tampering.
19. Sensor shall have manual adjustments for timer and sensitivities and override switches to force manual adjustment mode.

20. Sensor shall have adjustable sensitivity from 0% to 100% for both ultrasonic and infrared.
21. Controls shall be behind cover to resist tampering. All adjustments shall be accessible from the front of the sensor.
22. Sensor shall be available with a photocell adjustment from 20 to 3,000 Lux.
23. Sensor shall provide internal operating status and settings confirmation via LED motion lamp indicator.
24. Sensor shall have two (if 180 degree) or three (if 360 degree) real time LED motion indicators visible from the front of the unit: Red = infrared; green = ultrasonic.
25. Subject to compliance with the above requirements, provide models of one of the following:
    a. Hubbell-ATD Series
    b. Sensor Switch-CM-PDT Series
    c. Wattstopper-DT Series
    d. Mytech-Omni-DT Series
    e. Lithonia - LMTO Series
    f. Leviton – OSC UOW Series
    g. Greengate OMC – DT Series

C. 24 VDC POWER/CONTROL PACK: Where units are indicated, provide a power/control pack that meets the following minimum requirements:
1. Control module shall consist of a DC power supply and a dry contact relay for switching a lighting load.
2. Control module shall be available in versions to accept 120, and 277 VAC line voltages.
3. Output shall be 24VDC nominal, and shall be inherently safe, low voltage, limited power output (Class 2).
4. Output shall supply 100mA current, in addition to current consumed internally to operate internal relay.
5. Relay shall utilize normally open, silver alloy dry contacts, and shall be rated for a 20A ballast load at 120V and 277V.
6. Relay function shall not require more than 5 mA control current to operate.
7. Control module shall have line voltage wiring, consisting of input voltage and relay contact connections, exiting from one end, and low voltage DC connections, consisting of ground, power, and control wires, exiting from the other end.
8. Control module shall be sized to fit inside a standard 4” x 4” junction box.
9. Control module shall be equipped with a 1/2” EMT threaded male fitting on the line voltage end, such that it may be mounted to the outside of a junction box with the line voltage wiring internal to the box and the low voltage wiring external.
10. Control module shall be equipable with accessory 1/2” EMT threaded male fitting on the low voltage end, such that it may be mounted to the inside of a ballast cavity with the box and line voltage wiring internal to the cavity and the low voltage wiring external.
11. Slave module shall be available for switching additional circuits. Slave module has same construction and specifications as control module except without power supply function.
12. Subject to compliance with the above requirements, provide models of one of the following:
    a. Hubbell-CU Series

b. Sensor Switch-PP-20 Series
c. Wattstopper-BEP Series
d. Mytech-MP Series
e. Lithonia - LPCS Series
f. Greengate SP20-MV Series
g. Leviton – OSC/OSA Series

PART 3 – EXECUTION

3.1 INSTALLATION OF LIGHTING CONTROL EQUIPMENT:

A. Install occupancy lighting control system components and ancillary equipment as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices, to ensure that lighting control equipment complies with requirements.

B. Comply with requirements of NEC, and applicable portions of NECA's "Standard of Installation" pertaining to general electrical installation practices.

C. Coordinate with other electrical work, including raceways, and electrical boxes and fittings, as necessary to interface installation of lighting control equipment work with other work.

D. Contractor shall be on site as required, to adjust lighting control units for proper operation.

E. Mount the switchpack in a standard 4" junction box. Mount sensor to a standard 4” junction boxes. Refer to manufacturer supplied mounting instructions.

F. Spare Parts: Refer to Section 26 0502 for requirements.

3.2 FIELD QUALITY CONTROL:

A. Upon completion of installation and after circuitry has been energized, demonstrate capability and compliance of system with requirements.

B. System start-up: Provide a factory authorized technician to verify the installation and test the system.

C. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

D. Contractor shall visit the job site 3 months after the owner has taken occupancy and adjust any units not operating properly, otherwise remove and replace with new units.

3.3 PRODUCT SUPPORT AND SERVICES:

A. System Start-Up: Provide a factory authorized technician to verify the installation, test the system, and train the owner on proper operation and maintenance of the system. Before requesting start-up services, the installing contractor shall verify that:

1. The sensors have been fully installed in accordance with manufacturer’s installation instructions.
2. Low voltage wiring for overrides and sensors is completed.
3. Accurate ‘as-built’ load schedules have been prepared.
4. Proper notification of the impending start-up has been provided to the owner’s representative.
5. Programming of all switches, sensors, power packs, relays, etc. shall be completed by factory authorized technician, prior to final and training.

B. Factory support: Factory telephone support shall be available at no cost to the owner during the warranty period. Factory assistance shall consist of assistance in solving

programming or other application issues pertaining to the control equipment. The factory shall provide a toll free number for technical support.

C. Functional Testing:

1. The owner shall hire a third party that will conduct and certify the functional testing.

2. Lighting controls devices shall be tested to ensure that control hardware and software are calibrated, adjusted, programmed, and in proper working conditions in accordance with the construction documents, manufacturer's instructions and code requirements. The following shall be performed:

a. Certify that sensors have been located, aimed and calibrated per manufacturer recommendations.

b. Status indicator operates properly.

c. Fixtures that are controlled by auto-on controls turn on to permitted level.

d. Fixtures that are controlled by manual on controls operate when manually activated.

e. Fixtures do not turn on incorrectly due to HVAC or movement outside the controlled area.

f. Confirm that occupancy sensors turn off after space is vacated and do not turn on unless space is occupied.

g. Simulate unoccupied conditions and confirm that vacancy sensors only turn on manually and turn off after space is vacated.

3. The party responsible for the functional testing shall provide documentation that the installed lighting controls meet or exceed all performance criteria and shall not be directly involved in the design or construction of the project.

3.4 WARRANTY:

A. Manufacturer shall provide a one (1) year limited warranty on lighting control system. A ten (10) year limited warranty shall be provided on the lighting control relays.

3.5 RECORD DRAWINGS: Refer to Section 26 0502 for requirements.

3.6 TRAINING

A. Provide one (1) hours of video taped training on the operation and use of the lighting control equipment, at job site, at no cost to the Owner.

3.7 MANUFACTURER AUTHORIZED PERSONNEL TRAINING:

A. Building Operating Personnel Training: Train Owner's building personnel in procedures for starting-up, testing and operating lighting control system equipment.

END OF SECTION 26 0923

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SECTION 26 2416

PANELBOARDS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to panelboards specified herein.

1.2 DESCRIPTION OF WORK:

A. The extent of panelboard and enclosure work, is indicated by drawings and schedules.

B. Types of panelboards and enclosures in this section include lighting and appliance panelboards, and power distribution panelboards.

1.3 QUALITY ASSURANCE:

A. Provide units that have been UL listed and labeled. Comply with NEC as applicable to installation of panelboards, cabinets, and cutout boxes. Comply with NEC pertaining to installation of wiring and equipment in hazardous locations. Comply with NEMA Stds. Pub No. 250, "Enclosures for Electrical Equipment (1000 volt maximum). Pub No. 1, "Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less".

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with requirements, provide of one of the following:

1. Cutler Hammer Products, Eaton Corp.
2. General Electric Company
3. Siemens Energy & Automation, Inc.
4. Square D Company

2.2 PANELBOARDS:

A. GENERAL:

1. Except as otherwise indicated, provide panelboards, enclosures and ancillary components, of types, sizes, and ratings indicated. Equip with number of unit panelboard devices as required for complete installation. Fully equip "spaces" with hardware to receive breaker or switch of size indicated. Provide CU/AL rated lugs of proper size to accommodate conductors specified.

B. LIGHTING AND APPLIANCE PANELBOARDS:

1. Provide dead-front safety type lighting and appliance panelboards as indicated, with switching and protective devices in quantities, ratings, types, and arrangement shown. Provide bolt-on thermal magnetic type branch breakers. Where multiple breakers are indicated, provide with common trip handle. Series rated systems are not acceptable. Equip with aluminum bus bars, full-sized neutral bus, and ground bus.

C. PANELBOARD ENCLOSURES:

1. Provide galvanized sheet steel cabinet type enclosures, in sizes and NEMA types as indicated, code-gage minimum 16-gage thickness. Provide door-in-door hinged fronts. Provide fronts with adjustable indicating trim clamps, and doors with flush locks and keys, all panelboard enclosures keyed alike, with concealed door hinges and door swings as indicated. Equip with interior circuit-directory frame, and card with clear plastic covering. Provide baked gray enamel finish over a rust inhibitor. Provide enclosures fabricated by same manufacturer as overcurrent devices contained therein Bolt engraved plastic laminate labels indicating panel name and voltage on the interior and exterior of panelboards.

D. FINISH:

1. Coat interior and exterior of surface with manufacturer's standard color; baked on enamel finish.

E. ELECTRICAL IDENTIFICATION:

1. Refer to Section 260553 for requirements.

PART 3 – EXECUTION

3.1 INSTALLATION OF PANELBOARDS:

A. GENERAL:

1. Install panelboards and enclosures where indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", in compliance with recognized industry practices to ensure products fulfill requirements.

B. MOUNTING:

1. Coordinate installation of panelboards and enclosures with cable and raceway installation work. Anchor enclosures firmly to walls and structural surfaces, ensuring they are permanently and mechanically secure. Arrange conductors neatly within enclosure, and secure with suitable nylon ties. Fill out panelboard's circuit directory card upon completion of installation work. Utilize actual final building room numbers, not architectural numbers used on drawings. Identify individual lighting circuits and individual receptacle circuits by room served. Label circuit breakers to identify location of subpanel or equipment supplied using room numbers and equipment names. Include room number with equipment circuit designations. All directories to be typewritten.

END OF SECTION 26 2416

SECTION 26 2713

SERVICE ENTRANCE

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Division-26 Basic Materials and Methods sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

A. Extent of service-entrance work is indicated by drawings and schedules.

B. Switchboards, panels, disconnects, transformers, etc., used for service-entrance equipment are specified in applicable Division-26 sections, and are included as work of this section.

C. Consult local utility relative to all costs for line extensions, connections, etc., and include all costs for bringing service to the facility in base bid. Confirm location of point of service before bidding.

D. Provide labor and materials as required to accomplish power company metering in accordance with power company standards and requirements.

E. Provide concrete pads of size and type required for service transformers. Verify location, size, openings, reinforcing requirements with local utility before beginning work. Comply with local utility clearance requirements.

1.3 QUALITY ASSURANCE:

A. Comply with NEC and NEMA standards as applicable to construction and installation of service-entrance equipment and accessories. Provide service-entrance equipment and accessories that are UL-listed and labeled, and equipment marked, "Suitable for use as Service Equipment".

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

A. MAINTENANCE STOCK, FUSES: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS

2.1 SERVICE - ENTRANCE EQUIPMENT:

A. GENERAL: Provide service-entrance equipment and accessories, of types, sizes, ratings and electrical characteristics indicated, that comply with manufacturer's standard materials, design and construction in accordance with published product information, and as required for complete installation, and as herein specified.

B. Provide each service entrance switchboard with Surge Protective Devices as required by Section 264313.

2.2 OVERCURRENT PROTECTIVE DEVICES:

A. GENERAL: Provide overcurrent protective devices complying with Division-26 section "Overcurrent Protective Devices", and as indicated on drawings.

2.3 METERING:

A. METER SOCKETS: Provide meter sockets that comply with requirements of local utility

company supplying electrical power to service-entrance equipment of building project.

2.4 RACEWAYS AND CONDUCTORS:

A. GENERAL: Provide raceways and conductors complying with applicable Division-26 Basic Materials and Methods sections.

B. WALL AND FLOOR SEALS: Provide wall and floor seals complying with Division-26 Basic Materials and Methods section "Raceways".

PART 3 – EXECUTION

3.1 INSTALLATION OF SERVICE-ENTRANCE EQUIPMENT:

A. Install service-entrance equipment as indicated, in accordance with manufacturer's written instructions, and with recognized industry practices, to ensure that service-entrance equipment fulfills requirements. Comply with applicable installation requirements of NEC and NEMA standards.

B. Coordinate with other work, including utility company wiring, as necessary to interface installation of service-entrance equipment work with other work.

3.2 GROUNDING:

A. Provide system and equipment grounding and bonding connections for service-entrance equipment and conductors, as required.

3.3 ADJUST AND CLEAN:

A. Adjust operating mechanisms for free mechanical movement.

B. Touch-up scratched or marred enclosure surfaces to match original finishes.

3.4 FIELD QUALITY CONTROL:

A. Upon completion of installation of service-entrance equipment and electrical circuitry, energize circuitry and demonstrate capability and compliance with requirements. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units, and proceed with retesting.

END OF SECTION 26 2713

SECTION 26 2726

WIRING DEVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to wiring devices specified herein.

1.2 DESCRIPTION OF WORK:

A. The extent of wiring device work is indicated by drawings and schedules. Wiring devices are defined as single discrete units of electrical distribution systems that are intended to carry but not utilize electric energy.

B. Types of electrical wiring devices in this section include the following:

1. Receptacles
2. Switches
3. Cord caps
4. Cord connectors

1.3 QUALITY ASSURANCE:

A. Comply with NEC and NEMA standards as applicable to construction and installation of electrical wiring devices. Provide electrical wiring devices that have been UL listed and labeled.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 - PRODUCTS

2.1 FABRICATED WIRING DEVICES:

A. GENERAL:

1. Provide factory-fabricated wiring devices, in types, and electrical ratings for applications indicated and complying with NEMA Stds. Pub No. WD 1.

B. Provide wiring devices (of proper voltage rating) as follows:

	RECEPTACLE	**SWITCHES**			
MFGR		**1-POLE**	**3-WAY**	**4-WAY**	**W-PILOT**
Hubbell	HBL 5352	HBL 1221	HBL 1223	HBL 1224	HBL 1221-PL
Bryant	5352	1221	1223	1224	1221-PL
Pass Seymour	5352	20AC1	20AC3	20AC4	20AC1-RPL
Leviton	5362	1221	1223	1224	
Cooper	5352	1221	1273	1224	1221-PL

C. Provide devices in colors selected by Architect. Provide red devices on all emergency circuits.

D. GROUND-FAULT INTERRUPTER:

1. Provide general-duty, duplex receptacle, ground-fault circuit interrupters; feed-thru types, capable of protecting connected downstream receptacles on single circuit; grounding type UL-rated Class A, Group A, 20-amperes rating; 120-volts, 60 Hz; with solid-state ground-fault sensing and signaling; with 5 milliamperes ground-fault trip level; color as selected by Architect. Provide Hospital grade where required elsewhere by specification or drawings. Provide units of one of the following:
    a. P&S/Sierra
    b. Hubbell
    c. Leviton
    d. Square D

E. WEATHER-RESISTANT RECEPTACLES

1. Provide weather-resistant receptacles in outdoor locations such as under roofed open porches, canopies, marquees, etc.
2. Provide products of one of the following:
    a. Pass & Seymour 2095TRWRXXX.
    b. Hubbell GFTR20XX

2.2 WIRING DEVICE ACCESSORIES:

A. WALL PLATES:

1. Provide coverplates for wiring devices; plate color to match attached wiring devices. Provide (stainless steel) coverplates in all finished areas. Provide galvanized steel plates in unfinished areas. Provide blank coverplates for all empty outlet boxes.

B. WEATHER-PROTECTING DEVICE ENCLOSURES:

1. Where required for compliance with NEC 406-8 (receptacles installed outdoors for use other than with portable tools or equipment), provide weather-tight device covers that provide complete protection with the cord and cap inserted into the wiring device. Provide units that mount on either single or double gang devices.
2. Provide products of one of the following for In Box Horizontal for brick and cast stone:
    a. Arlington Industries
        i. DSHB1C Clear Cover
        ii. DSHB1W White Cover
        iii. DSHB1BR Brown Cover
        iv. DSHB1BRC Brown Clear Cover
3. Provide products of one of the following for In Box Vertical or Horizontal for Stucco and Metal Sidings:
    a. Arlington Industries
        i. DSBVM1C Clear Cover
        ii. DSBVM1W White Cover
        iii. DSBHM1C Clear Cover
        iv. DSBHM1W White Cover
4. Provide products of one of the following for roof mounted installations:

a. Intermatic WP1020 or WP1030

b. P&S WIUC10C or WIUC20c

PART 3 – EXECUTION

3.1 GENERAL

A. Install wiring devices as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation" and in accordance with recognized industry practices to fulfill project requirements.

B. Coordinate with other work, including painting, electrical box and wiring work, as necessary to interface installation of wiring devices with other work. Install devices in boxes such that front of device is flush and square with coverplate. Drawings are small scale and, unless dimensioned, indicate approximate locations only of outlets, devices, equipment, etc. Locate outlets and apparatus symmetrically on floors, walls and ceilings where not dimensioned and coordinate with other work. Verify all dimensioned items on job site. Consult architectural cabinet, millwork, and equipment shop drawings before beginning rough-in of electrical work. Adjust locations of all electrical outlets as required to accommodate work in area, and to avoid conflicts with wainscoat, back splash, tackboards, and other items.

C. Install wiring devices only in electrical boxes that are clean; free from excess building materials, dirt, and debris.

D. Install blank plates on all boxes without devices.

E. Delay installation of wiring devices until wiring work and painting is completed. Provide separate neutral conductor from panel to each GFI receptacle.

F. Install GFI receptacles for all receptacles installed in the following locations:

1. Restrooms, locker rooms, kitchens, within 6 feet of any sink, or when serving vending machines and electric drinking fountains.

2. Indoor wet locations, non-dwelling garages, elevator rooms and pits.

3. Outdoors, and on rooftops.

G. Electrical Identification: Refer to Section 260553 for requirements.

3.2 PROTECTION OF WALL PLATES AND RECEPTACLES:

A. At time of substantial completion, replace those items, that have been damaged, including those stained, burned and scored.

3.3 GROUNDING:

A. Provide electrically continuous, tight grounding connections for wiring devices, unless otherwise indicated.

3.4 TESTING:

A. Prior to energizing circuitry, test wiring devices for electrical continuity and proper polarity connections. After energizing circuitry, test wiring devices to demonstrate compliance with requirements.

END OF SECTION 26 2726

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SECTION 26 2815

OVERCURRENT PROTECTIVE DEVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to overcurrent protective devices specified herein.

1.2 DESCRIPTION OF WORK:

A. Extent of overcurrent protective device work is indicated by drawings and schedules and specified herein. Overcurrent protective devices specified herein are for installation as individual components in separate enclosures; and for installation as integral components of switchboard and panelboards. See Section 262413, Switchgear and Switchboards, and Section 262416, Panelboards.

B. Types of overcurrent protective devices in this section include the following for operation at 600 Volts and below:

1. Molded case thermal circuit breakers
2. Fusible switches
3. Fuses

C. Refer to other Division-26 sections for cable/wire and connector work required in conjunction with overcurrent protective devices.

1.3 QUALITY ASSURANCE

A. Comply with NEC requirements and NEMA and ANSI standards as applicable to construction and installation of overcurrent devices.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with requirements, provide products of one of the following (main and branch device manufacturer must be same as panelboard and/or switchboard manufacturer):

B. CIRCUIT BREAKERS AND FUSIBLE SWITCHES:

1. Cutler Hammer Products, Eaton Corp.
2. General Electric Co.
3. Square D Co.
4. Siemens Energy and Automation

C. MOLDED CASE THERMAL TRIP CIRCUIT BREAKERS:

1. Provide factory-assembled, molded case circuit breaker for power distribution panelboards and switchboards; and for individual mounting, as indicated. Provide breakers of amperage, voltage, and RMS interrupting rating shown, with permanent thermal trip and adjustable instantaneous magnetic trip in each pole. Series rated systems are not acceptable. Construct with overcenter, trip-free,

toggle type operating mechanisms with quick-make, quick-break action and positive handle indication. Construct breakers for mounting and operating in any physical position and in an ambient temperature of 40 degrees C. Provide with mechanical screw type removable connector lugs, AL/CU rated, of proper size to accommodate conductors specified.

2. Circuit breakers 15 amps through 599 amps shall be molded case thermal trip circuit breakers.

D. FUSIBLE SWITCHES:

1. Provide factory-assembled fusible switch units for power distribution panelboards and switchboards, and individual mounting as indicated. Provide switch units of amperage, voltage, and RMS interrupting rating as shown, with quick-make, quick-break mechanisms, visible blades and dual horsepower ratings. Series rated systems are not acceptable. Equip with lockable handles with on-off indication. Interlock switch covers and handles to prevent opening in "ON" position. Provide switch with Class R rejection fuse clip kits. Provide AL/CU rated lugs of proper size to accommodate conductors specified.

2.2 FUSES

A. GENERAL: Except as otherwise indicated, provided fuses of type, sizes and ratings and electrical characteristics of a single manufacturer as follows. Provide fuses labeled UL Class L or UL Class R, current limiting and rated for up to 200,000 amperes. Provide Buss KAZ signal activating fuses where required elsewhere in specification.

B. Where fuses are shown feeding individual or groups of equipment items, comply with manufacturer's recommendation for fusing; adjust fuse size and type as necessary to comply with manufacturer's recommendation.

C. Provide and install spare fuse cabinet in main electrical room.

D. BRANCH CIRCUITS: For motor circuits, transformer circuits, or other inductive loads, provide UL Class RK5 (FRN-R, FRS-R or TR-R, TRS-R or ECN-R, ECN-S or FLN-R, FLS-A). For other circuits, provide UL Class RK1, (KTN-R, KTS-R OR A2K-R, A6K-R or NCLR, SCLR OR KLNR, KLSR).

E. MANUFACTURER: Subject to compliance with requirements, provide fuses of one of the following:

1. Bussman Mfg. Co.

2. Mersen (Ferraz Shawmut)

3. Reliance Fuse Div./Brush Fuse Inc.

4. Littlefuse, Inc.

PART 3 – EXECUTION

3.1 INSTALLATION OF OVERCURRENT PROTECTIVE DEVICES:

A. Install overcurrent protective devices as indicated, in accordance with the manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. Comply with NEC and NEMA standards for installation of overcurrent protective devices.

B. Coordinate with work as necessary to interface installations of overcurrent protective devices with other work.

C. Install fuses in overcurrent protective devices. For motor circuits, fuse sizes shown on drawings are for general guidance only. Size fuses in accordance with fuse manufacturer's recommendation for given motor nameplate ampere rating. Test operation. If nuisance tripping occurs, increase fuse size and disconnect device (if necessary) as required to provide nuisance free tripping. Adjust fuse size properly for

ambient temperature, frequent starting and stopping of motor loads, and for loads with long start times. Include all costs in bid.

D. Electrical Identification: Refer to Section 260553 for requirements.

3.2 FIELD QUALITY CONTROL

A. Prior to energization of overcurrent protective devices, test devices for continuity of circuitry and for short-circuits. Correct malfunctioning units, and then demonstrate compliance with requirements.

END OF SECTION 26 2815

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SECTION 26 2816

MOTOR AND CIRCUIT DISCONNECTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of each Division-26 section making reference to motor and circuit disconnect switches specified herein.

1.2 DESCRIPTION OF WORK:

A. Extent of motor and circuit disconnect switch work is indicated by drawings and schedule. Work includes complete installations and electrical connections.

1.3 QUALITY ASSURANCE:

A. Provide motor and circuit disconnect switches that have been UL listed and labeled. Comply with applicable requirements of NEMA Standards Pub. No. KS 1, and NEC.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. MANUFACTURER: Subject to compliance with requirements, provide products of one of the following (for each type of switch):

1. Cutler Hammer Products, Eaton Corp.
2. Square D Company
3. General Electric Company
4. Siemens Energy & Automation, Inc.

2.2 FABRICATED SWITCHES:

A. GENERAL: Provide disconnect and safety switches as indicated herein. Provide:

1. General duty switches on 240 Volt rated circuits.
2. Heavy duty switches on 480 volt rated circuits.
3. HP rated switches on all motor circuits.

B. GENERAL DUTY SWITCHES: Provide general-duty type, sheet-steel enclosed switches, fusible or non-fusible as indicated of types, sizes and electrical characteristics indicated; rated 240 volts, 60 hertz; incorporating spring assisted, quick-make, quick-break mechanisms. Provide single phase or three phase and with solid neutral as required by application. Equip with operating handle that is capable of being padlocked in OFF position. Provide NEMA 1 or NEMA 3R as required by application, unless noted. Provide fusible switches with Class R rejection fuse clip kits.

C. HEAVY-DUTY SWITCHES: Provide heavy-duty type, sheet-steel enclosed safety switches, fusible or non-fusible as indicated, of types, sizes and electrical characteristics indicated; rated 600 volts, 60 hertz; incorporating quick-make, quick-break type mechanisms. Provide single phase or 3 phase, and with solid neutral as required by

application, Equip with operating handle that is capable of being padlocked in OFF position. Provide NEMA 1 or NEMA 3R as required by application unless noted. Provide fusible switches with Class R rejection fuse clip kits.

D. FUSES: Provide fuses for switches, as required of classes, types and ratings needed to fulfill electrical requirements for service indicated. See Section 262815 Overcurrent Protective Devices for fuse types. Refer to Section 26 0502 for requirements.

E. Electrical Identification: Refer to Section 260553 for requirements.

PART 3 - EXECUTION

3.1 INSTALLATION OF MOTOR AND CIRCUIT DISCONNECT SWITCHES:

A. Install motor and circuit disconnect switches where indicated, complying with manufacturer's written instructions, applicable requirements of NEC, NEMA, and NECA's "Standard of Installation" and in accordance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate motor and circuit disconnect switch installation work with electrical raceway and cable work, as necessary for proper interface.

C. Install disconnect switches used with motor driven appliances, and motors and controllers within sight of controller position.

END OF SECTION 26 2816

SECTION 26 2913

MOTOR STARTERS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. This section is a Division-26 Basic Materials and Methods section, and is part of Division-26 sections making reference to motor starters specified herein.

1.2 DESCRIPTION OF WORK:

A. Extent of motor starter work is indicated by drawings and schedules.

B. Types of motor starters in this section include the following:

1. AC Fraction Horsepower Manual Starters
2. AC Line Voltage Manual Starters
3. AC Non-Reversing Magnetic Starters
4. AC Combination Non-Reversing Magnetic Starters

1.3 QUALITY ASSURANCE:

A. Comply with NEC and NEMA Standards as applicable to wiring methods, construction and installation of motor starters. Comply with applicable requirements of UL 508, "Electric Industrial Control Equipment", pertaining to electrical motor starters. Provide units that have been UL-listed and labeled.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

A. Subject to compliance with requirements, provide products of one of the following (for each type and rating of motor starter):

1. Allen-Bradley Co.
2. Appleton Electric Co.
3. Crouse-Hinds Co.
4. Eaton Corp., Cutler Hammer Products
5. General Electric Co.
6. Siemens Energy & Automation, Inc.
7. Square D Co.

B. MAINTENANCE STOCK, FUSES: Refer to Section 26 0502 for requirements.

2.2 MOTOR STARTERS:

A. GENERAL: Except as otherwise indicated, provide motor starters and ancillary components; of types, sizes, ratings and electrical characteristics indicated that comply with manufacturer's standard materials, design and construction in accordance with published information and as required for complete installations.

B. THERMAL OVERLOAD UNITS: Provide thermal overload units, sized to actual running full load current, not to motor plate current. Size heaters for mechanical equipment after air and water balancing have been completed.

C. AC FRACTIONAL HP MANUAL STARTERS (EQUAL TO SQUARE D CLASS 2510): Provide manual, single-phase, 1 and 2 pole, 300 volt AC max, fractional HP motor starters, of types, ratings and electrical characteristics indicated; equip with one piece thermal overload relay with field adjustment capability of plus or minus 10 percent of nominal overload heater rating; for protection of AC motors of 1 HP and less. (For manually controlled motors in excess of 1 HP, see Line Voltage Manual Starters specified herein). Provide starter with quick-make, quick-break trip free toggle mechanisms, green pilot lights, and with lock-off toggle operated handle. Mount surface units in NEMA 1 enclosures, unless noted otherwise. Provide NEMA 3R enclosure in exterior or damp location unless noted otherwise. Provide flush mounted units with coverplate to match wiring device coverplates.

D. AC LINE VOLTAGE MANUAL STARTERS (EQUAL TO SQUARE D CLASS 2510): Provide line voltage manual starters, of types, ratings and electrical characteristics indicated; 2 or 3 pole, 600 volt AC max; equip with pushbutton operator, low voltage protection feature, and green pilot light. Provide starters with trip free mechanism such that contacts will open under load and remain open until thermal element has cooled, and unit is reset. Mount surface units in NEMA 1 enclosure, unless noted otherwise. Provide NEMA 3R enclosure in exterior or damp location, unless noted otherwise. Provide overlapping trim for flush mounted units.

E. AC NON-REVERSING MAGNETIC STARTERS (EQUAL TO SQUARE D CLASS 8536): Provide line voltage magnetic starters, of types, ratings and electrical characteristics indicated; 2 or 3 pole, 600 volt max, with thermal overload protection in all phases and inherent under voltage release. Equip units with holding contact, 2 normally open, and 2 normally closed auxiliary contacts, unless noted otherwise. Provide fused control transformer in each starter and 120V control coil. Mount hand-off-auto switch, red pilot light, and reset button in face of enclosure. Provide NEMA 1 enclosure unless noted otherwise. Provide NEMA 3R enclosure in exterior or damp location, unless noted otherwise. Equip all spare starters complete with items as specified herein.

F. AC COMBINATION NON-REVERSING MAGNETIC STARTERS (EQUAL TO SQUARE D CLASS 8538): Provide line voltage combination starters, of types, ratings, and electrical characteristics; 2 or 3 pole, 600 volt maximum with non-reversing magnetic starters as specified herein; in common cubicle or enclosure with fusible disconnect switch. Provide quick-make, quick-break, disconnect for NEMA sizes 1, 2, 3, and 4; and visible blade, automatic circuit interrupters with push-to-trip feature and separate fuse clips for larger NEMA sizes. Fuse all starters with dual-element (time-delay) fuses equal to Bussman FRN/FRS-R. Equip disconnect switch with Class R rejection fuse kits. Mount hand-off-auto switch, red pilot light, and reset button in face of enclosure. Provide combination starters for individual mounting, or for group mounting in motor control centers as indicated. Provide NEMA 1 enclosures unless otherwise indicated. Provide NEMA 3R enclosure in exterior or damp locations, unless noted otherwise.

PART 3 - EXECUTION

3.1 INSTALLATION OF MOTOR STARTERS:

A. Install motor starters as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC, NEMA standards, and NECA's "Standards of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

B. Install fuses in fusible disconnects, if any. Mount chart inside each starter indicating heater type, size, and ampere ratings available.

C. Electrical Identification: Refer to Section 260553 for requirements.

3.2 ADJUST AND CLEAN:

A. Inspect operating mechanisms for malfunctioning and, where necessary, adjust units for free mechanical movement.

B. Touch-up scratched or marred surfaces to match original finish.

3.3 FIELD QUALITY CONTROL:

A. Subsequent to wire/cable hook-up, energize motor starters and demonstrate functioning of equipment in accordance with requirements.

END OF SECTION 26 2913

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SECTION 26 5100

INTERIOR AND EXTERIOR BUILDING LIGHTING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

B. Division-26 Basic Materials and Methods sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

A. Types of lighting fixtures in this section are indicated by schedule and include the following:

1. LED (Light Emitting Diode)

1.3 QUALITY ASSURANCE:

A. Comply with NEC, NEMA and ANSI 132,1 as applicable to installation and construction of lighting fixtures. Provide lighting fixtures that have been UL-listed and labeled.

B. Components and fixtures shall be listed and approved for the intended use by a National Recognized Testing Laboratory (NRTL) including: UL, ETL, and CSA or equivalent

C. All led products shall comply with the latest version of Illuminating Engineer Society (IES) publications LM-79 and LM-80.

D. All fixtures shall be approved and listed on at least one of these 3 Qualified Fixture Lists; Energy Star, Design Lighting Consortium (DLC), or Lighting Design Lab.

1.4 SUBMITTALS: Refer to Section 26 0502 for requirements.

PART 2 – PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

A. Subject to compliance with requirements, provide products of one of the following (for each type of fixture):

1. LED:

a. Cree

b. Nichia

c. Samsung

d. Philips Lumiled

e. Osram

f. Xicato

2.2 INTERIOR AND EXTERIOR LIGHTING FIXTURES:

A. GENERAL:

1. Provide lighting fixtures, of sizes, types and ratings indicated complete with, but not necessarily limited to, housings, lamps, lamp holders, reflectors, ballasts, LED drivers, starters, and wiring. Label each fixture with manufacturer's name

and catalog number. Provide all enclosed fixtures with positive latch mechanisms; spring tension clips not acceptable. Provide all exterior fixtures with damp or wet location label as required by application.

B. SUPPORT REQUIREMENTS:

1. Provide all pendant and stem hung fixtures with flexible ball joint hangers at all points of support. Equip hooks used to hang fixtures with safety latches. Provide all detachable fixture parts, luminous ceiling accessories, louvers, diffusers, lenses, and reflectors with locking catches, screws, safety chain, or safety cable.

C. LIGHT EMITTING DIODE (LED) LUMINAIRES:

1. LED luminaires that can be serviced in place shall have a disconnecting means internal to the luminaries to disconnect simultaneously from the source of supply all conductors of the driver, including the grounded conductor. Disconnects shall not be required under the following exceptions:

a. Luminaries located in hazardous locations.

b. Luminaries used for egress lighting.

c. Cord-and-plug luminaries.

d. In industrial establishments with restricted public access where conditions of maintenance and supervision ensure that only qualified persons service the installation.

e. Where more than one luminaire is installed in a space and where disconnecting the supply conductors to the luminaire will not leave the space in total darkness.

f. Provide LED luminaires which are tested in accordance with IES LM-79, diodes tested in accordance with IES LM-80, and provide a minimum R9 rating of ≥ 50 (unless specified differently), a CRI rating of ≥ than 80 and L70 (6K) = 50,000 hours (IES TM-21). Provide with 0-10V dimming drivers as standard.

g. The fixture manufacturer(s) shall warrant the luminaires, in their entirety, to be free from defects in material or workmanship for at least 5 years from date of manufacture. Provide warranty in accordance with other sections of this specification and include a certificate of warranty from the fixture manufacturer with extended warranty information and proper forms and procedure description.

D. DIFFUSERS:

1. Where plastic diffusers are specified, provide 100 percent virgin acrylic compound; minimum thickness, .125 inches.

PART 3 - EXECUTION

3.1 INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures at locations and heights as indicated, in accordance with fixture manufacturer's written instructions, applicable requirements of NEC, NECA's "Standards of Installation", NEMA standards, and with recognized industry practices to ensure that lighting fixtures fulfill requirements.

B. Coordinate with other work as appropriate to properly interface installation of lighting fixtures with other work. Consult architectural reflected ceiling plan for exact location of all lighting fixtures.

C. Provide all necessary supports, brackets, and miscellaneous equipment for mounting of

fixtures. Support all ceiling mounted fixtures from the building structure; independent of the ceiling system, unless noted. Support each recessed fixture (fluorescent incandescent, and/or HID) from the building structure with #12 ga. steel wire attached to each corner (in addition to supports normally provided for attachment to the ceiling system). Provide backing supports above (or behind) sheetrock, plaster and similar ceiling and wall materials. Support surface mounted ceiling fixtures from channel. Support ceiling mounted outlet boxes independent of the raceway system, and capable of supporting 200 pounds. Feed each recessed fixture directly from an outlet box with flex conduit as required; do not loop from fixture to fixture. See plans for additional details.

D. FIXTURE WHIPS:

1. Provide each lay-in light fixture with at least 36" (Not to exceed 72") of 3/8" steel flexible conduit.

E. Coordinate lighting in mechanical room with duct and equipment locations to avoid obstruction of illumination.

F. Provide gypsum board protection as required, (acceptable to fire official having jurisdiction) to ensure fire rating of each ceiling that the fixtures are installed in.

G. COORDINATION MEETINGS:

1. Meet at least twice with the ceiling installer. Hold first meeting before submittal of shop drawings to coordinate each light fixture mounting condition with ceiling type. During second meeting, coordinate fixture layout in each area.

2. Meet at least once with the mechanical installer prior to fabrication and installation of duct work. Coordinate depth and location of all fixtures and duct work in all areas.

H. ADJUST AND CLEAN:

1. Clean lighting fixtures of dirt and debris upon completion of installation.

2. Protect installed fixtures from damage during remainder of construction period. Repair all nicks and scratches to appearance of original finish.

I. SPARE PARTS: Refer to Section 26 0502 for requirements.

3.2 FIELD QUALITY CONTROL:

A. Upon completion of installation of lighting fixtures, and after building circuitry has been energized, apply electrical energy to demonstrate capability and compliance with requirements.

B. Where possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise remove and replace with new units, and proceed with retesting.

C. At the time of Substantial Completion, replace lamps in interior lighting fixtures that are observed to be noticeably dimmed after the Contractor's use and testing, as judged by Architect/Engineer.

D. GROUNDING:

1. Provide equipment grounding connections for each lighting fixture.

END OF SECTION 26 5100

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